

ECN 102, Spring 2020

Week 4 Section

MT1, W18, Problem 2d

The variable `weeks` measures the number of weeks that an unemployed person is unemployed until finding another job.

KEY CRITICAL VALUES FOR THIS EXAM

$$t_{44,.005} = 2.692$$

$$t_{44,.01} = 2.414$$

$$t_{44,.025} = 2.015$$

$$t_{44,.05} = 1.680$$

$$t_{44,.10} = 1.301$$

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. summarize weeks
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| Variable | Obs | Mean | Std. Dev. | Min | Max |
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| weeks | 45 | 15.48889 | 12.57274 | 0 | 50 |

Provide a 90 percent confidence interval for the population mean length of an unemployment spell.

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- Formula: $\left(\bar{x} \pm t_{n-1, \alpha/2} \times \frac{s}{\sqrt{n}} \right)$

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Provide a 90 percent confidence interval for the population mean length of an unemployment spell.

- Formula: $\left(15.4889 \pm 1.680 \times \frac{12.5728}{\sqrt{45}} \right)$

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- Answer: (12.3402, 18.6376)

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- Answer: (12.3402, 18.6376)
- `mean weeks, level(90)`

MT1, W18, Problem 2e

The claim is made that the population mean length of an unemployment spell is twenty weeks. Test this claim at significance level 0.05. State clearly the null and alternative hypotheses and your conclusion.

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$$t \equiv \frac{\bar{x} - \mu^*}{s/\sqrt{n}}$$

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- Remember, $T \equiv \frac{\bar{X} - \mu}{S/\sqrt{n}} \sim T(n-1)$. If hypothesized value μ^* is correct, then should have $T \equiv \frac{\bar{X} - \mu^*}{S/\sqrt{n}} \sim T(n-1)$.

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- If $\mu^* = \mu$, then t unlikely to be “far” from zero. If far, reject null.

MT1, W18, Problem 2e

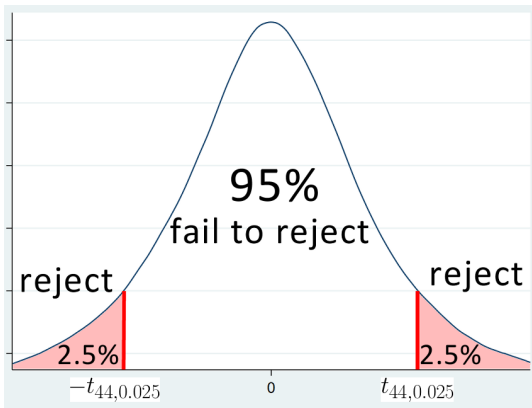
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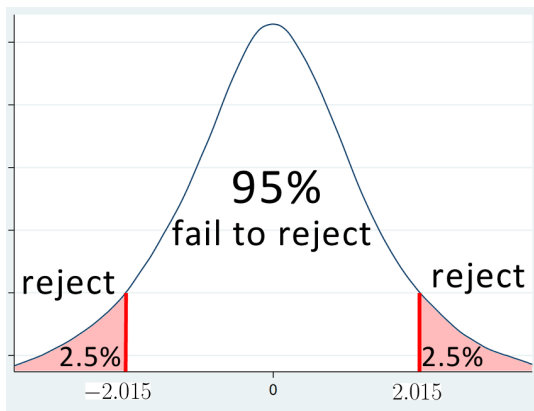
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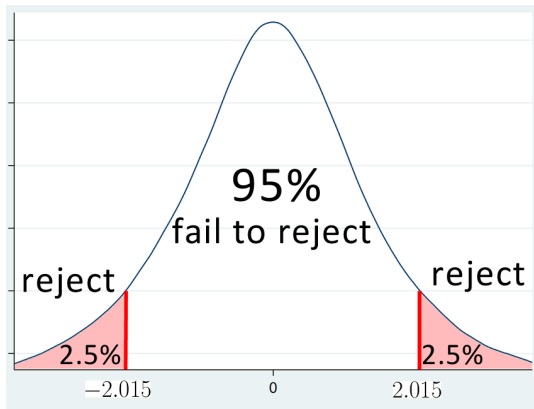
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- $| -2.4069 | > 2.015$, reject the null at 5% significance

MT1, W18, Problem 2 extra

The claim is made that the population mean length of an unemployment spell is twenty weeks. What command would you use in Stata to find the p -value of the test?

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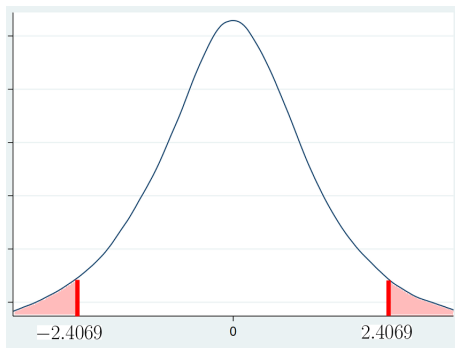
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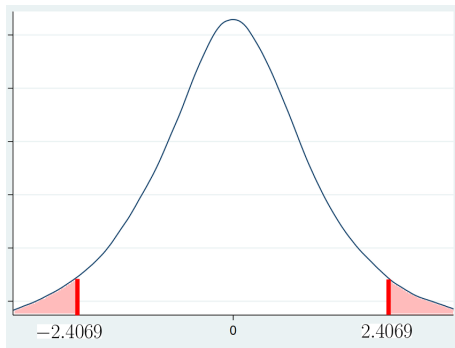
- p -value tells you the probability of observing a t -statistic at least as extreme as the one we observe, if the null hypothesis were true
- In other words, $P(T_{44} < -2.4069)$ or $P(T_{44} > 2.4069)$



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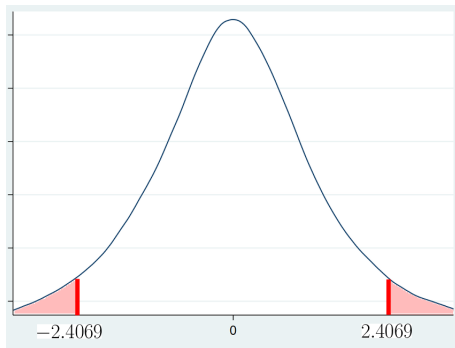


- `di 2*ttail(44,2.4069)` or `ttest weeks = 20`

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- `di 2*ttail(44,2.4069)` or `ttest weeks = 20`
- Equals $p = .02$, so reject at .10 and .05 but not .01 significance

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- There's is 90% probability that the interval does contain μ , however
- If the interval probably contains μ but doesn't contain μ^* , then μ^* is probably not μ
- Reject the null at 10% significance

MT1, W18, Problem 2 extra

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Three equivalent justifications for rejecting a null hypothesis at significance level α

- The $1 - \alpha$ percent confidence interval does not contain μ^*
- The t -statistic is larger in magnitude than the $t_{n-1, \alpha/2}$ critical value
- The p -value is less than α

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Thus we can only *fail to reject* the null; it is a logical mistake to *accept* it.