

ECN 102, Spring 2020

Week 4 Section
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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
weeks	45	15.48889	12.57274	0	50

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- Answer: (12.3402, 18.6376)

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- `mean weeks, level(90)`

MT1, W18, Problem 2e

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- If null is correct (i.e. $\mu^* = \mu$), then $T \equiv \frac{\bar{X} - \mu^*}{S/\sqrt{n}} \sim T(n-1)$.
- If $\mu^* = \mu$, then t unlikely to be “far” from zero. If far, reject null.

MT1, W18, Problem 2e

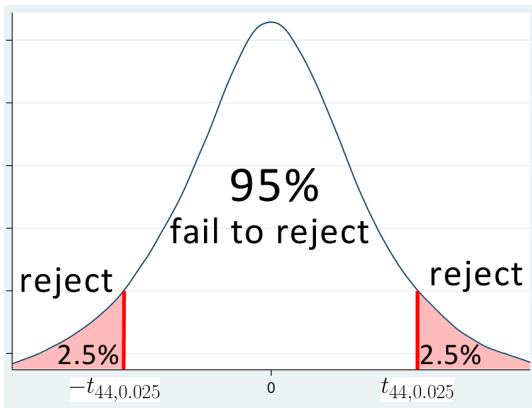
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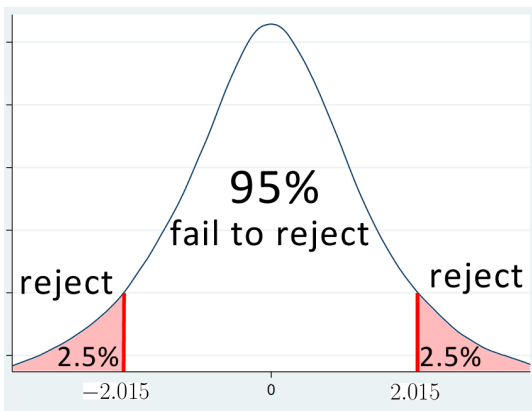
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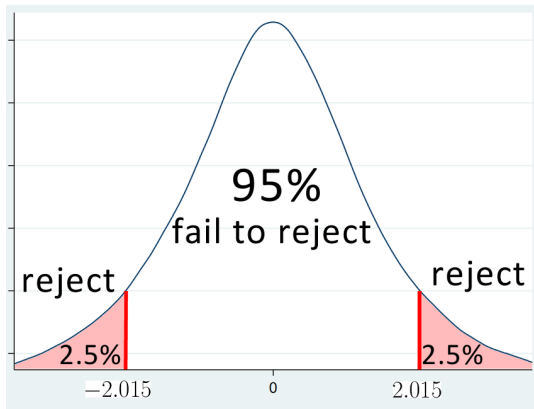
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- $|-2.4069| > 2.015$, reject the null at 5% significance

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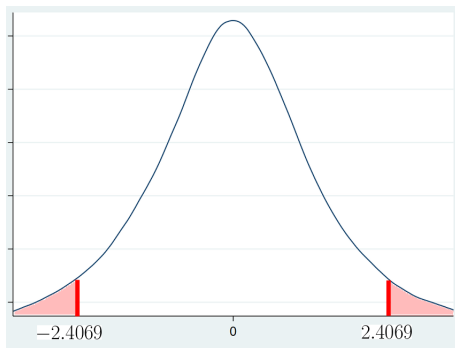
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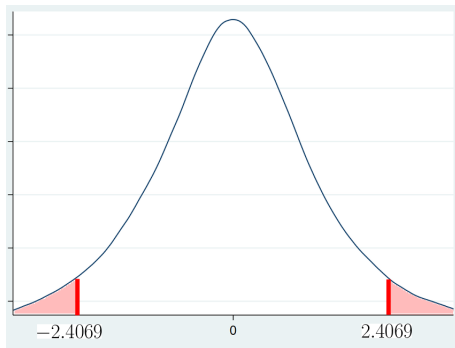
- p -value tells you the probability of observing a t -statistic at least as extreme as the one we observe, if the null hypothesis were true
- In other words, $P(T_{44} < -2.4069)$ or $P(T_{44} > 2.4069)$



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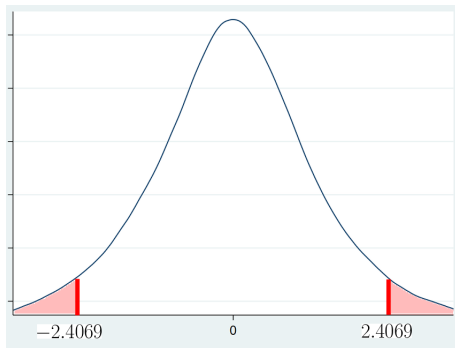


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- `di 2*ttail(44,2.4069)` or `ttest weeks = 20`
- Equals $p = .02$, so reject at .10 and .05 but not .01 significance

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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

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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.