
A Summary of Hypothesis Testing in Linear Regression Models

Rejection and Non-rejection Regions for t and F Statistics (at significance level α)

	<u>Rejection region</u>	<u>Non-rejection region</u>
<u>Two-tail t test:</u>	$ t > t_{\alpha/2}$ i.e., $t > t_{\alpha/2}$ and $t < -t_{\alpha/2}$	$ t \leq t_{\alpha/2}$ i.e., $-t_{\alpha/2} \leq t \leq t_{\alpha/2}$
<u>Right-tail t test:</u>	$t > t_{\alpha}$	$t \leq t_{\alpha}$
<u>Left-tail t test:</u>	$t < -t_{\alpha}$	$t \geq -t_{\alpha}$
<u>F test:</u>	$F > F_{\alpha}$	$F \leq F_{\alpha}$

P-values of t_0 and F_0 , the Calculated Sample Values of t and F Statistics

	<u>Definition</u>	<u>Computation in <i>Stata</i></u>
Two-tail p-value of t_0	$= \Pr(t > t_0 \mid H_0 \text{ is true})$	<code>display 2*ttail(N-K, abs(t0))</code>
Right-tail p-value of t_0	$= \Pr(t > t_0 \mid H_0 \text{ is true})$	<code>display ttail(N-K, t0)</code>
Left-tail p-value of t_0	$= \Pr(t < t_0 \mid H_0 \text{ is true})$	<code>display 1 - ttail(N-K, t0)</code>
P-value of F_0	$= \Pr(F > F_0 \mid H_0 \text{ is true})$	<code>display Ftail(K-K0, N-K, F0)</code>

P-value Formulation of Decision Rule

1. $p\text{-value} < \alpha \Rightarrow$ *reject* H_0 at significance level α
2. $p\text{-value} \geq \alpha \Rightarrow$ *retain* H_0 at significance level α