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Stata tip 112: Where did my p-values go? (Part 2)

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In a previous Stata tip (Buis 2007), I discussed how to recover t statistics, p-values, and confidence intervals for regression parameters by using the results that are returned by an estimation command. In this tip, I continue that discussion by showing how p-values can be recovered for other tests that are sometimes displayed by estimation commands. For example, consider a linear regression as estimated by `regress` (see [R] **regress**). It displays the results of an F test of the hypothesis that all coefficients except the constant are equal to 0. However, `regress` only returns the F statistic (`e(F)`), the number of model degrees of freedom (`e(df_m)`), and the number of residual degrees of freedom (`e(df_r)`); it does not return the p-value. If you need the p-value, you can use the function `Ftail()` to look up the appropriate p-value, as illustrated below.

```
. sysuse auto
(1978 Automobile Data)
. regress price mpg i.rep78
```

Source	SS	df	MS		Number of obs =	69
					F(5, 63) =	4.39
Model	149020603	5	29804120.7		Prob > F =	0.0017
Residual	427776355	63	6790100.88		R-squared =	0.2584
					Adj R-squared =	0.1995
Total	576796959	68	8482308.22		Root MSE =	2605.8

price	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
mpg	-280.2615	61.57666	-4.55	0.000	-403.3126	-157.2103
rep78						
2	877.6347	2063.285	0.43	0.672	-3245.51	5000.78
3	1425.657	1905.438	0.75	0.457	-2382.057	5233.371
4	1693.841	1942.669	0.87	0.387	-2188.274	5575.956
5	3131.982	2041.049	1.53	0.130	-946.7282	7210.693
_cons	10449.99	2251.041	4.64	0.000	5951.646	14948.34

```
. display Ftail(e(df_m), e(df_r), e(F))
.00171678
```

Often such additional tests are based on the chi-squared distribution. In that case, we can use the `chi2tail()` function to recover the p-value. An example is given below. In this example, the test statistic is returned in `e(chi2_c)`. The number of degrees of freedom for this test is not returned by `biprobit` (see [R] **biprobit**), but we know that in this case the number of degrees of freedom has to be 1.

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```
. webuse school
. biprobit private vote logptax loginc years, nolog
Bivariate probit regression                     Number of obs   =         95
                                                Wald chi2(6)    =       9.59
Log likelihood = -89.254028                     Prob > chi2     =     0.1431
```

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
private						
logptax	-.1066962	.6669782	-0.16	0.873	-1.413949	1.200557
loginc	.3762037	.5306484	0.71	0.478	-.663848	1.416255
years	-.0118884	.0256778	-0.46	0.643	-.0622159	.0384391
_cons	-4.184694	4.837817	-0.86	0.387	-13.66664	5.297253
vote						
logptax	-1.288707	.5752266	-2.24	0.025	-2.416131	-.1612839
loginc	.998286	.4403565	2.27	0.023	.1352031	1.861369
years	-.0168561	.0147834	-1.14	0.254	-.0458309	.0121188
_cons	-.5360573	4.068509	-0.13	0.895	-8.510188	7.438073
/athrho	-.2764525	.2412099	-1.15	0.252	-.7492153	.1963102
rho	-.2696186	.2236753			-.6346806	.1938267

```
Likelihood-ratio test of rho=0:     chi2(1) =  1.38444    Prob > chi2 = 0.2393
. display chi2tail(1,e(chi2_c))
.23934684
```

Reference

Buis, M. L. 2007. Stata tip 53: Where did my p-values go? *Stata Journal* 7: 584–586.