

# Package ‘cragg’

January 8, 2021

**Title** Tests for Weak Instruments in R

**Version** 0.0.1

**Description** Implements Cragg-

Donald (1993) <doi:10.1017/S0266466600007519> and Stock and Yogo (2005) <doi:10.1017/CBO9780511614491.006> t  
struments in R.

**License** GPL (>= 3)

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 7.1.1

**Imports** expm (>= 0.999)

**Suggests** testthat (>= 3.0.0), knitr, MASS, rmarkdown

**Config/testthat/edition** 3

**Depends** R (>= 2.10)

**VignetteBuilder** knitr

**NeedsCompilation** no

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**Repository** CRAN

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cragg_donald	<i>Calculate the Cragg-Donald statistic for a given model.</i>
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**Description**

Calculate the Cragg-Donald statistic for a given model.

**Usage**

```
cragg_donald(X, D, Z, data = data.frame())
```

**Arguments**

X	(formula). A one-sided formula of control variables.
D	(formula). A one-sided formula of endogenous variables (treatments)
Z	(formula). A one-sided formula of instruments
data	(dataframe). An optional dataframe, list, or environment containing the variables used in the model. As with many of the base R functions, if the variables are not found here, they may be searched for in the environment <code>cragg_donald()</code> was called.

**Value**

(cd\_test) results object of class "cd\_test"

**Examples**

```
#Obtain the Cragg-Donald statistic for a model that instruments
#Sepal Width on Petal Length, Petal Width, and Species, while controlling
#for Sepal.Length (a toy example).
cragg_donald(X=~Sepal.Length, D=~Sepal.Width,
Z=~Petal.Length + Petal.Width + Species, data = iris)
```

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stock_yogo_recommender	<i>Recommend a critical value for the Cragg-Donald test given a maximum allowable bias/size distortion</i>
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**Description**

Recommend a critical value for the Cragg-Donald test given a maximum allowable bias/size distortion

**Usage**

```
stock_yogo_recommender(K, N, B, size_bias)
```

**Arguments**

K	(int). The number of instruments.
N	(int). The number of endogenous variables (treatments)
B	One of [.05, .1, .15, .2, .25, .3]. The maximum size of allowable bias relative to the normal OLS or the maximum Wald test size distortion.
size_bias	Either "bias" or "size". Whether to use a critical value based on the maximum allowable bias relative to regular OLS (bias), or maximum Wald test size distortion.

**Value**

(float) the recommended critical value.

**Examples**

```
#To recommend a critical value for a test with 2 endogenous variables
#and four instruments based on a 5% maximum allowable bias relative to OLS
stock_yogo_recommender(4,2,.05,"bias")
```

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stock_yogo_test	<i>Perform the Stock and Yogo test for weak instruments</i>
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**Description**

Perform the Stock and Yogo test for weak instruments

**Usage**

```
stock_yogo_test(X, D, Z, data, B = 0.05, size_bias = "bias")
```

**Arguments**

X	(formula). A one-sided formula of control variables.
D	(formula). A one-sided formula of endogenous variables (treatments)
Z	(formula). A one-sided formula of instruments
data	(dataframe). An optional dataframe, list, or environment containing the variables used in the model. As with many of the base R functions, if the variables are not found here, they may be searched for in the environment <code>cragg_donald()</code> was called.
B	One of [.05, .1, .15, .2, .25, .3]. The maximum size of allowable bias relative
size_bias	Either "bias" or "size". Whether to use a critical value based on the maximum allowable bias relative to regular OLS (bias), or maximum Wald test size distortion (size).

**Value**

(sy\_test) the results of the stock and yogo test.

**Examples**

```
#Perform the Stock and Yogo test on a model that instruments  
#Sepal Width on Petal Length, Petal Width, and Species, while controlling  
#for Sepal.Length (a toy example).
```

```
stock_yogo_test(X=~Sepal.Length, D=~Sepal.Width,  
Z=~Petal.Length + Petal.Width + Species,  
size_bias="bias",data = iris)
```

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