Package 'ivlewbel'

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Type Package

Title Uses heteroscedasticity to estimate mismeasured and endogenous regressor models

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Description GMM estimation of triangular systems using heteroscedasticity based instrumental variables as in Lewbel (2012)

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Depends stats, gmm, plyr, lmtest

NeedsCompilation no

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R topics documented:

`lewbel` *Identification using heteroscedasticity*

Description

This function estimates the model parameters and associated standard errors for a linear regression model with one or more endogenous regressors. Identification is achieved through heteroscedastic covariance restrictions within the triangular system.

Usage

```
lewbel(formula, data, clustervar = NULL, robust = TRUE)
```

Arguments

formula	an object of class "formula" (or one that can be coerced to that class).
data	the data frame containing these data. This argument must be used.
clustervar	a character value naming the cluster on which to adjust the standard errors and test statistics.
robust	if TRUE the function reports standard errors and test statistics that have been corrected for the presence heteroscedasticity using White's method.

Details

The formula follows a four-part specification. Each part is separated by a vertical bar character "|". The following formula is an example: `y2 ~ y1 | x1 + x2 + x3 | x1 + x2 | z1`. Here, `y2` is the dependent variable and `y1` is the endogenous regressor. The code `x1 + x2 + x3` represents the exogenous regressors whereas the third part `x1 + x2` specifies the exogenous heteroscedastic variables from which the instruments are derived. The final part `z1` is optional, allowing the user to include tradtional instrumental variables. If both `robust=TRUE` and `!is.null(clustervar)` the function overrides the robust command and computes clustered standard errors and test statistics adjusted to account for clustering. This function computes partial F-statistics that indicate potentially weak identification. In cases where there is more than one endogenous regressor the Angrist-Pischke (2009) method for multivariate first-stage F-statistics is employed.

Value

coef.est	a coefficient matrix with columns containing the estimates, associated standard errors, test statistics and p-values.
call	the matched call.
num.obs	the number of observations.
j.test	J-test for overidentifying restrictions.
f.test.stats	Partial F-test statistics for weak IV detection.

References

Angrist, J. and Pischke, J.S. (2009). Mostly Harmless Econometrics: An Empiricist's Companion, Princeton University Press.

Lewbel, A. (2012). Using heteroscedasticity to identify and estimate mismeasured and endogenous regressor models. Journal of Business & Economic Statistics, 30(1), 67-80.

Examples

```
set.seed(1234)
n = 1000
x1 = rnorm(n, 0, 1)
```

```
x2 = rnorm(n, 0, 1)
u = rnorm(n, 0, 1)
s1 = rnorm(n, 0, 1)
s2 =  rnorm(n, 0, 1)
ov = rnorm(n, 0, 1)
z1 = rnorm(n, 0 ,1)
e1 = u + exp(x1)*s1 + exp(x2)*s1
e2 = u + exp(-x1)*s2 + exp(-x2)*s2
y1 = 1 + x1 + x2 + ov + e2 + 2*z1
y2 = 1 + x1 + x2 + y1 + 2*ov + e1
data = data.frame(y2, y1, x1, x2, z1)

lewbel(formula = y2 ~ y1 | x1 + x2 | x1 + x2, data = data)
lewbel(formula = y2 ~ y1 | x1 + x2 | x1 + x2 | z1, data = data)
```

Index