



Title

kdbwselect — Bandwidth Selection Procedures for Kernel Density Estimation and Inference.

Syntax

```
kdbwselect varname [if] [in] [, eval(gridvar) neval(#) rho(#) kernel(kernelfn)
bwselect(bwmethod) bwcheck(#) imsegrid(#) separator(#) ]
```

Description

kdbwselect implements bandwidth selectors for kernel density point estimators and inference procedures developed in [Calonico, Cattaneo and Farrell \(2018\)](#). See also [Calonico, Cattaneo and Farrell \(2020\)](#) for related optimality results. It also implements other bandwidth selectors available in the literature. See Wand and Jones (1995) and Fan and Gijbels (1996) for background references.

A detailed introduction to this command is given in [Calonico, Cattaneo and Farrell \(2019\)](#).

Companion command is: [kdrobust](#) for point estimation and inference procedures.

Related Stata and R packages useful for empirical analysis are described in the following website:

<https://nppackages.github.io/>

Options

eval(gridvar) specifies the grid of evaluation points for *xvar*. By default it uses 30 equally spaced points over to support of *xvar*.

neval(#) specifies the number of evaluation points to estimate the regression functions. Default is 30 evaluation points.

rho(#) specifies the value of *rho*, so that the bias bandwidth *b* equals $b=h/\rho$. Default is **rho(1)** if *h* is specified but *b* is not.

kernel(kernelfn) specifies the kernel function used. Options are: **epanechnikov**, and **uniform**. Default is **kernel(epanechnikov)**.

bwselect(bwmethod) bandwidth selection procedure to be used. By default it computes both *h* and *b*, unless *rho* is specified, in which case it only computes *h* and sets $b=h/\rho$. Options are:

mse-dpi second-generation DPI implementation of MSE-optimal bandwidth. Default choice.

mse-rot ROT implementation of MSE-optimal bandwidth.

imse-dpi second-generation DPI implementation of IMSE-optimal bandwidth.

imse-rot ROT implementation of IMSE-optimal bandwidth.

ce-dpi second generation DPI implementation of CE-optimal bandwidth.

ce-rot ROT implementation of CE-optimal bandwidth.

Note: MSE = Mean Square Error; IMSE = Integrated Mean Squared Error; CE = Coverage Error; DPI = Direct Plug-in; ROT = Rule-of-Thumb.

Default is **bwselect(mse-dpi)**. For details on implementation see [Calonico, Cattaneo and Farrell \(2019\)](#).

bwcheck(#) specifies an optional positive integer so that the selected bandwidth is enlarged to have at least # effective observations available at each evaluation point.

imsegrid(#) number of evaluations points used to compute the IMSE bandwidth selector. Default is 30 points.

separator(#) draws separator line after every # variables; default is separator(5).

Example:

```

Setup
. sysuse auto

MSE bandwidth selection procedure
. kdbwselect length

```

Saved results

kdbwselect saves the following in **e()**:

Scalars	
e(N)	original number of observations
Macros	
e(varname)	name of variable
e(bwselect)	bandwidth selection choice
e(kernel)	kernel choice
Matrices	
e(bws)	estimation result

References

- Calonico, S., M. D. Cattaneo, and M. H. Farrell. 2018. On the Effect of Bias Estimation on Coverage Accuracy in Nonparametric Inference. *Journal of the American Statistical Association*, 113(522): 767-779.
- Calonico, S., M. D. Cattaneo, and M. H. Farrell. 2019. nprobust: Nonparametric Kernel-Based Estimation and Robust Bias-Corrected Inference. *Journal of Statistical Software*, 91(8): 1-33. doi: [10.18637/jss.v091.i08](https://doi.org/10.18637/jss.v091.i08).
- Calonico, S., M. D. Cattaneo, and M. H. Farrell. 2020. Coverage Error Optimal Confidence Intervals for Local Polynomial Regression, working paper.
- Fan, J., and Gijbels, I. 1996. *Local Polynomial Modelling and Its Applications*, London: Chapman and Hall.
- Wand, M., and Jones, M. 1995. *Kernel Smoothing*, Florida: Chapman & Hall/CRC.

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