

# **metrics**: Towards a package for doing econometrics in R

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## **Abstract**

This paper proposes a package **metrics** for doing econometrics in R. The discussion is in two parts. First, I discuss the current state of **metrics**, which is just a small collection of some useful functions for doing econometrics in R. Second, I discuss how the **metrics** package should evolve in the future.

The **metrics** package currently contains four main functions: robust (heteroskedasticity and/or autocorrelation consistent) standard errors, general (nonlinear) hypothesis testing, linear instrumental variables (IV) estimation, and maximum likelihood estimation of binary dependent variable models. These are the minimum necessary functions I needed to use R for teaching an undergraduate level econometrics class. I discuss current implementation and example usage of these functions in **metrics**. The key features of these functions are as follows. The heteroskedasticity and autocorrelation consistent (HAC) covariance supports data-based automatic bandwidth selection rules of Andrews (1991) and Newey and West (1994). The hypothesis test function `wald.test` provides an interface where users specify restrictions as R **expressions**. The Wald  $\chi^2$  statistic is computed via the delta method using the symbolic (or “algorithmic”) derivative routine `deriv` in the base package. The IV estimator is implemented as a linear GMM estimator, providing robust standard errors and an over-identification test statistic. The binary dependent variable models are estimated by maximum likelihood using hard-coded analytic derivatives. A variety of options for computing the asymptotic covariance matrix is available and can be fed into `wald.test` for general hypothesis testing.

As for the future of **metrics**, I identify several aspects of econometric analyses for which an interface needs to be developed for R to be of general use to econometricians. These include handling of panel or longitudinal data sets and a general interface for GMM and ML estimation with support for a variety of inference procedures.

JEL classification: C61, C63.

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