

Portuguese Economic Journal (2020) 19: 33–47
<https://doi.org/10.1007/s10258-019-00157-0>

ORIGINAL ARTICLE



A comparative study of several bootstrap-based tests for the volatility in continuous-time diffusion models

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Received: 28 July 2017 / Accepted: 28 January 2019 / Published online: 9 February 2019
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Abstract

This article develops three bootstrap-based tests for a parametric form of volatility function in continuous-time diffusion models. The three tests are the generalized likelihood ratio test by Fan et al. (Ann Stat 29(1):153–193, 2001), the nonparametric kernel test (LWZ) by Li and Wang (J Econometrics 87(1):145–165, 1998) and Zheng (J Econ 75(2):263–289, 1996) and the nonparametric test (CHS) by Chen et al. (2017). Monte Carlo simulations are performed to evaluate the sizes and power properties of these bootstrap-based tests in finite samples over a range of bandwidth values. We find that the bootstrap-based tests are not influenced by prior restrictions on the functional form of the drift function and that the bootstrap-based CHS test has better power performance than the bootstrap-based GLR and LWZ tests in detecting a parametric form of volatility. An empirical study on weekly treasury bill rate is further conducted to demonstrate these bootstrap-based test procedures.

Keywords Continuous-time diffusion models · Generalized likelihood ratio test · Nonparametric kernel test · Bootstrap · Treasury bill rate

JEL Classification C12 · C13 · C58

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