Bipower Variation with Noisy Data

OLE E. BARNDORFF-NIELSEN
The T. N. Thiele Centre for Mathematics in Natural Science,
Department of Mathematical Sciences,
University of Aarhus, Ny Munkegade, DK-8000 Aarhus C, Denmark
oebn@imf.au.dk

PETER REINHARD HANSEN
Department of Economics, Stanford University,
Landau Economics Building, 579 Serra Mall,
Stanford, CA 94305-6072, USA
peter.hansen@stanford.edu

ASGER LUNDE
Department of Marketing and Statistics,
Aarhus School of Business, University of Aarhus
Fuglesangs Alle 4, DK-8210 Aarhus V, Denmark
alunde@asb.dk

NEIL SHEPHARD
Oxford-Man Institute, University of Oxford,
Blue Boar Court, Alfred Road, Oxford OX1 4EH, UK
neil.shephard@economics.ox.ac.uk

August 2007

Abstract: Recent innovations in the financial econometrics literature have allowed us to estimate the ex-post variation of asset prices in the presence of noise and, separately, extract from the variation of asset prices the piece due to jumps when there is no noise. In this paper we combine these two tasks and provide estimates of the variation of the continuous component of prices taking into account the effect of noise. We provide a complete distribution theory for the staggered Bipower variation under flexible parametric assumptions about the noise. Moreover, we suggest a method for estimating the parameters of the noise distribution. The finite sample performance of our estimators is studied using simulation, while empirical work illustrates their use in practice.

Keywords: Market frictions; Quadratic variation; Bipower variation; Realised kernel; Realised variance.