

Strong approximation for the sums of squares of augmented GARCH sequences

ALEXANDER AUE^{1,*}, ISTVÁN BERKES² and LAJOS HORVÁTH^{1,**}

¹*Department of Mathematics, University of Utah, 155 South 1440 East, Salt Lake City UT 84112-0090, USA. E-mail: *aue@math.utah.edu; **horvath@math.utah.edu*

²*Institut für Statistik, Technische Universität Graz, Steyrergasse 17/IV, A-8010 Graz, Austria. E-mail: berkes@stat.tu-graz.ac.at*

We study so-called augmented GARCH sequences, which include many submodels of considerable interest, such as polynomial and exponential GARCH. To model the returns of speculative assets, it is particularly important to understand the behaviour of the squares of the observations. The main aim of this paper is to present a strong approximation for the sum of the squares. This will be achieved by an approximation of the volatility sequence with a sequence of blockwise independent random variables. Furthermore, we derive a necessary and sufficient condition for the existence of a unique (strictly) stationary solution of the general augmented GARCH equations. Also, necessary and sufficient conditions for the finiteness of moments are provided.

Keywords: augmented GARCH processes; moments; partial sums; stationary solutions; strong approximation