

Tilburg University

Comments on

Engwerda, J.C.

Published in:
System Dynamics in Economic and Financial Models

Publication date:
1997

[Link to publication in Tilburg University Research Portal](#)

Citation for published version (APA):
Engwerda, J. C. (1997). Comments on: Nonlinear dynamics and predictability in the Austrian stockmarket by E.J. Dockner, A. Prskawetz and G. Feichtinger. In C. Heij, H. Schumacher, B. Hanzon, & K. Praagman (Eds.), *System Dynamics in Economic and Financial Models* (pp. 67-68). John Wiley & Sons.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

J.C. ENGWERDA

The authors of this chapter address the question whether there is empirical evidence for the presence of deterministic chaos in the Austrian stock market. First, the data is filtered by a GARCH(1,1) filter, and then the occurrence of chaos is tested with the BDS statistic, a non-parametric test for the innovations of the filtered data being i.i.d. Only for one of the six time series analysed, the

ATX series, do the authors report evidence that the innovations of the filtered series might possess an additional non-linear structure. In the second part of the chapter it is investigated whether similar conclusions can be obtained if one uses local forecasting techniques. Two techniques, reported by Finkenstädt and Fernández-Rodríguez *et al.*, respectively, are implemented. Using the Finkenstädt technique for the filtered series, significant one-step-ahead predictions are found for two of the series, CA and CA (preferred). But using the Fernández-Rodríguez *et al.* technique none of the residuals of the filtered series seems to be short-term predictable.

These findings raise a number of questions. It seems that both local forecasting techniques are unable to provide us, under all circumstances, with answers that are in agreement with the findings of the BDS statistic. For the Finkenstädt procedure this holds in only three cases, for the technique of Fernández-Rodríguez *et al.* in five situations. Furthermore both techniques are somehow not able to determine the remaining non-linear structure of the filtered ATX series, exactly the job they were supposed to do. Of course, the forecasts made depend on the choice of the predictor. So, one way to proceed might be to look for more ingenious predictors. In this respect the question can, for example, be posed as to why the type of non-linearity should be time-invariant. It might be interesting to consider only neighbours that date back not too long ago. On the other hand, this absence of agreement might also be due to a lack of data, or to a wrong choice of the parameters in both algorithms.

Another problem that arises in this context is the validity of the various premises made. In particular, the noise-free setting assumption seems to be a strong one. It is well known (see Brock and Dechert (1985)) that if this assumption is violated, then it is very difficult to discern whether a given time series still has some non-linear structure. In other words, even if the BDS statistic gives evidence for IID structure in a time series, in general, then we cannot conclude that there does not exist non-linear structure in the studied time series if we are not sure about the absence of noise. In view of this it may be the case that the BDS statistics obtained here for the CA and CA (preferred) time series do not contradict the statistics obtained using the local forecasting technique of Fernández-Rodríguez *et al.* This technique might even be a better testing technique for an i.i.d. structure than the BDS statistic, given this 'noisy' context. This is a rather fundamental point, because the question whether the innovation process obtained after filtering is either a white-noise or a non-linear process that is disturbed by a white-noise process with some small variance plays a fundamental role in answering a question such as whether the efficient market hypothesis holds.

Altogether, these comments make two points clear. First, that there is a need for a systematic analysis of test procedures for i.i.d. structures. Second, a better theoretical understanding is needed about the working of financial markets.