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Long Memory in the Ukrainian Stock

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LONG MEMORY IN THE UKRAINIAN STOCK MARKET AND FINANCIAL CRISES

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Abstract

This paper examines persistence in the Ukrainian stock market during the recent financial crisis. Using two different long memory approaches (R/S analysis and fractional integration) we show that this market is inefficient and the degree of persistence is not the same in different stages of the financial crisis. Therefore trading strategies might have to be modified. We also show that data smoothing is not advisable in the context of R/S analysis.

Keywords: *Persistence, Long Memory, R/S Analysis, Fractional Integration*

JEL Classification: *C22, G12*

1. INTRODUCTION

2. DATA AND METHODOLOGY

$$M - 1 \qquad M \qquad N =$$

$$N_i = \frac{Y_{t+}}{Y_t} \quad t = M -$$

$$= N \qquad A \qquad A_n$$

$$I_a \qquad N_k \quad k \qquad N \qquad I_a \qquad n$$

$$e_a$$

$$= - \sum_{=}$$

$$X_{k,a} \qquad e_a \qquad I_a$$

$$X_{k,a} = \sum_{i=1}^k N_{i,a} - e_a$$

$$I_a \qquad X_{k,a} \qquad X_{k,a}$$

$$= \quad - \quad \leq \leq$$

$$S_{I_a} \qquad I_a$$

$$= - \sum_{=}$$

$$R_{I_a}$$

n

$$\frac{1}{n} = \frac{1}{\sum_{i=1}^n i}$$

n

$$(M - 1)/n$$

n

$$n = (M - 1)/2$$

$$\log(R/S) = \log(c) +$$

$H \log(n).$

H

[Insert Table 1 about here]

$$- = = \pm$$

$$d = \frac{1}{m} \sum_{s=1}^m I_s^d - \frac{1}{m} \sum_{s=1}^m \lambda_s$$

$$\overline{C d} = \frac{1}{m} \sum_{s=1}^m I_s^d \quad \lambda_s = \frac{\pi s}{T} \quad \frac{m}{T} \rightarrow$$

d

[Insert Figures 3 – 8 about here]

[Insert Table 2 about here]

[Insert Table 3 about here]

3. EMPIRICAL RESULTS

[Insert Figures 10 -12 about here]

[Insert Table 5 about here]

[Insert Figure 13 about here]

References

Tables and Figures

Table 1: Hurst exponent interval characteristics

Table 2: Hurst exponent estimation for different variants of data filtration

Table 3: Hurst exponent estimates with standard methodology (aliquot number of groups) and modified (aliquant number of groups) for different data sets

Table 4: Full-sample analysis of Ukrainian stock market persistence

Table 5: Estimates of d and 95% confidence intervals

		1.124 (1.091, 1.162)	
		1.100 (1.049, 1.161)	
		1.099 (1.056, 1.151)	
		0.276 (0.243, 0.314)	
		0.261 (0.209, 0.311)	
		0.251 (0.207, 0.334)	
		0.259 (0.229, 0.292)	
		0.311 (0.264, 0.363)	
		0.313 (0.261, 0.376)	

Figure 1 – Periodisation of financial crisis 2007-2009

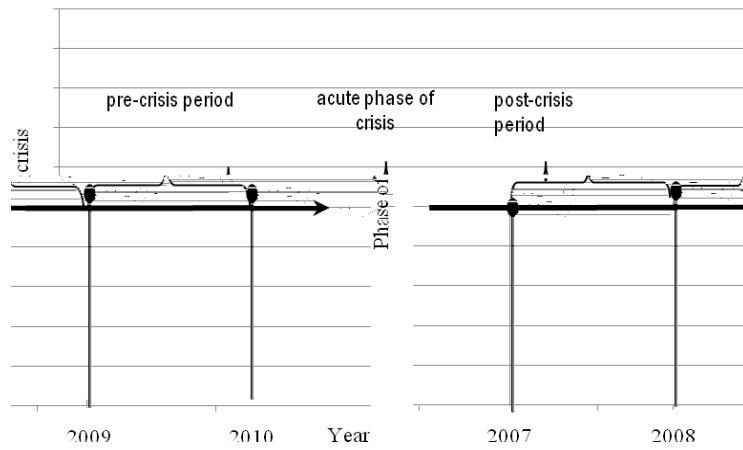


Figure 2 – Dynamics of the VIX Index in 2007-2010

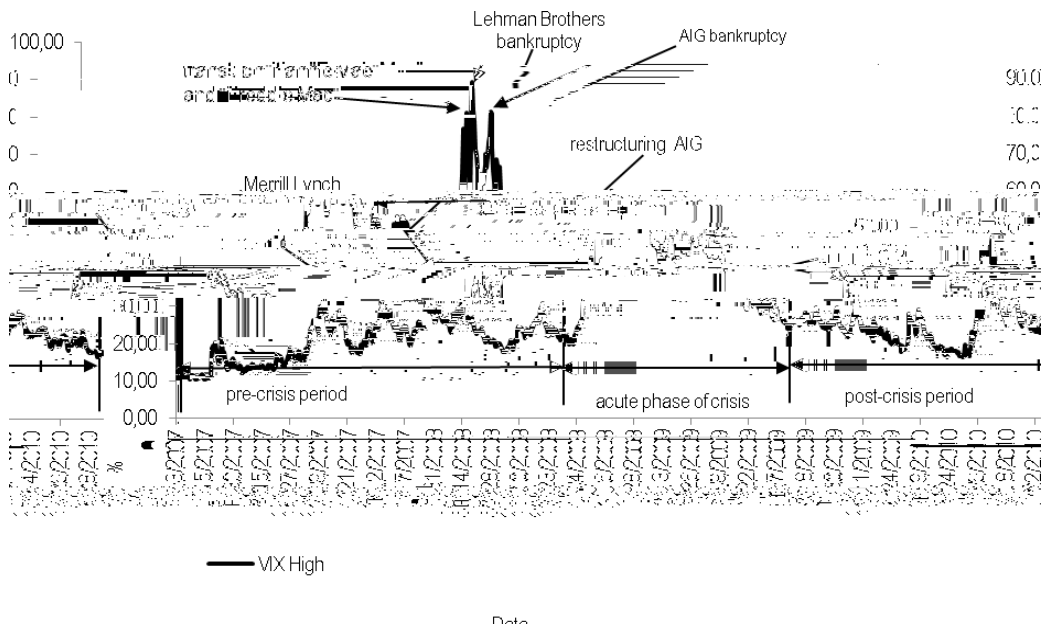
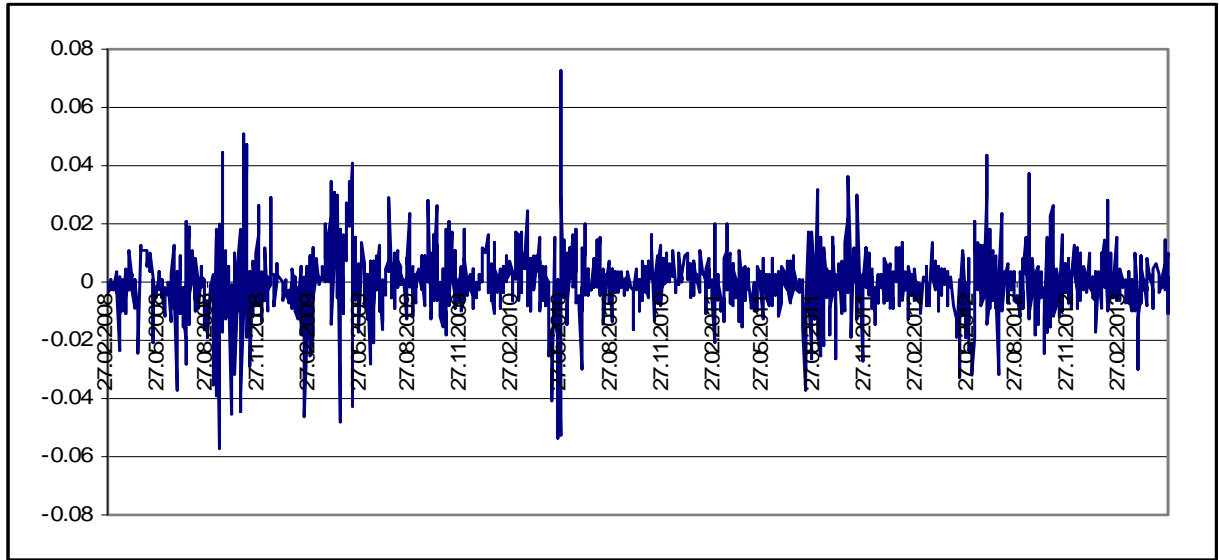


Figure 5

a) Unfiltered UX data



27.02.20

.7.02.20

.7.12.20

Figure 6

Figure 7

a) Randomly generated data

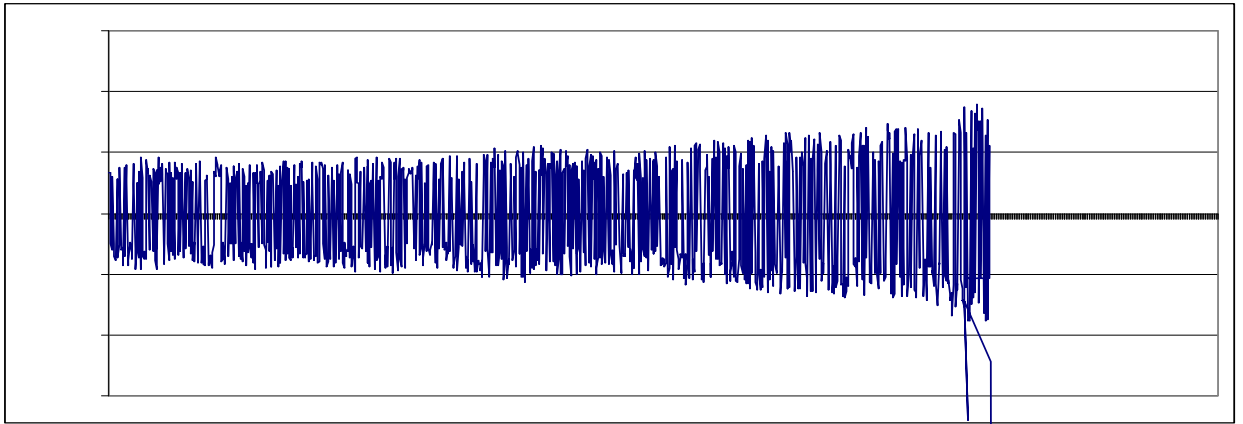


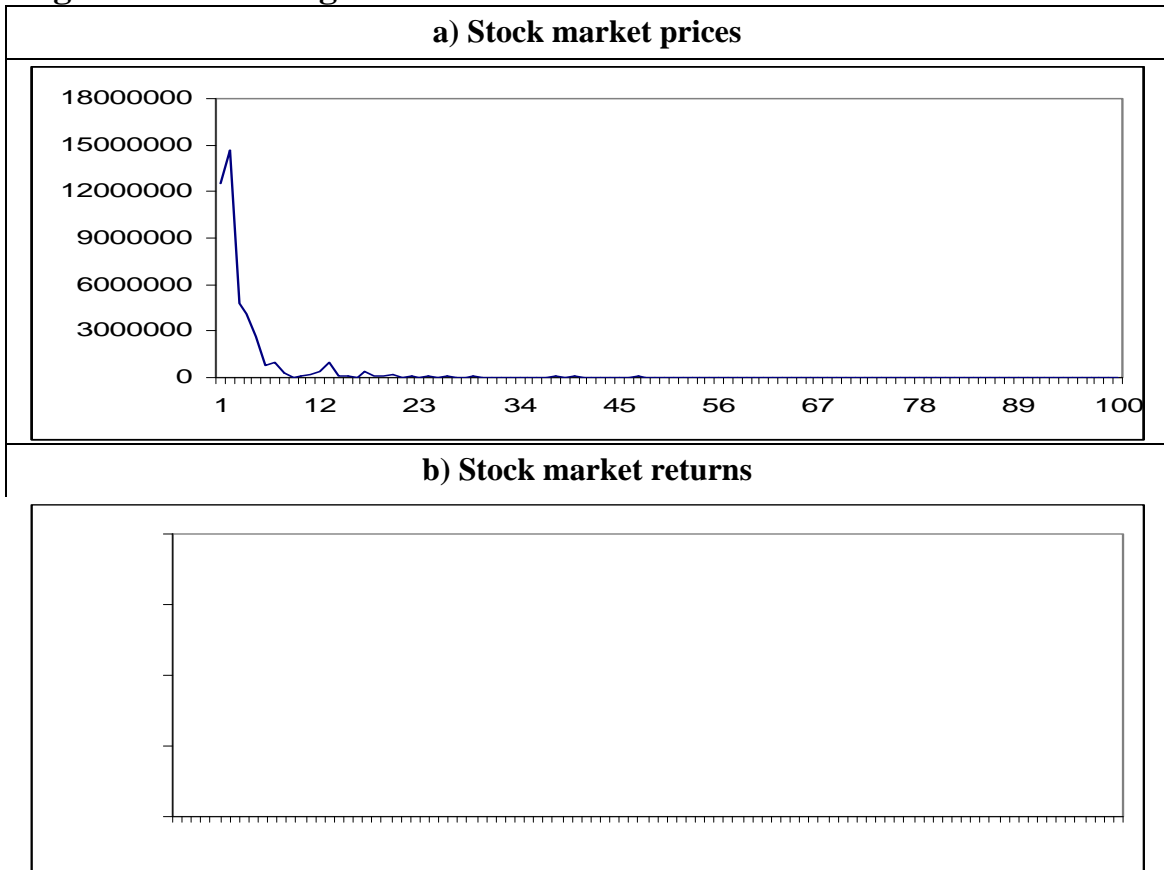
Figure 8

Figure 9: Dynamics of Hurst exponent during 2003-2013

Figure 11: Correlograms

a) Stock market prices

Figure 12: Periodograms



Fig



304

405

506

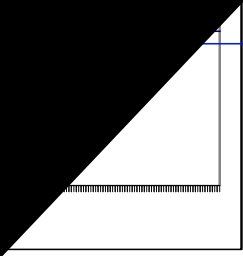


Figure 14: Stability results based on recursive estimates

a) Stock market prices	
Adding 10 observation each time	Moving windows of 300 observations