

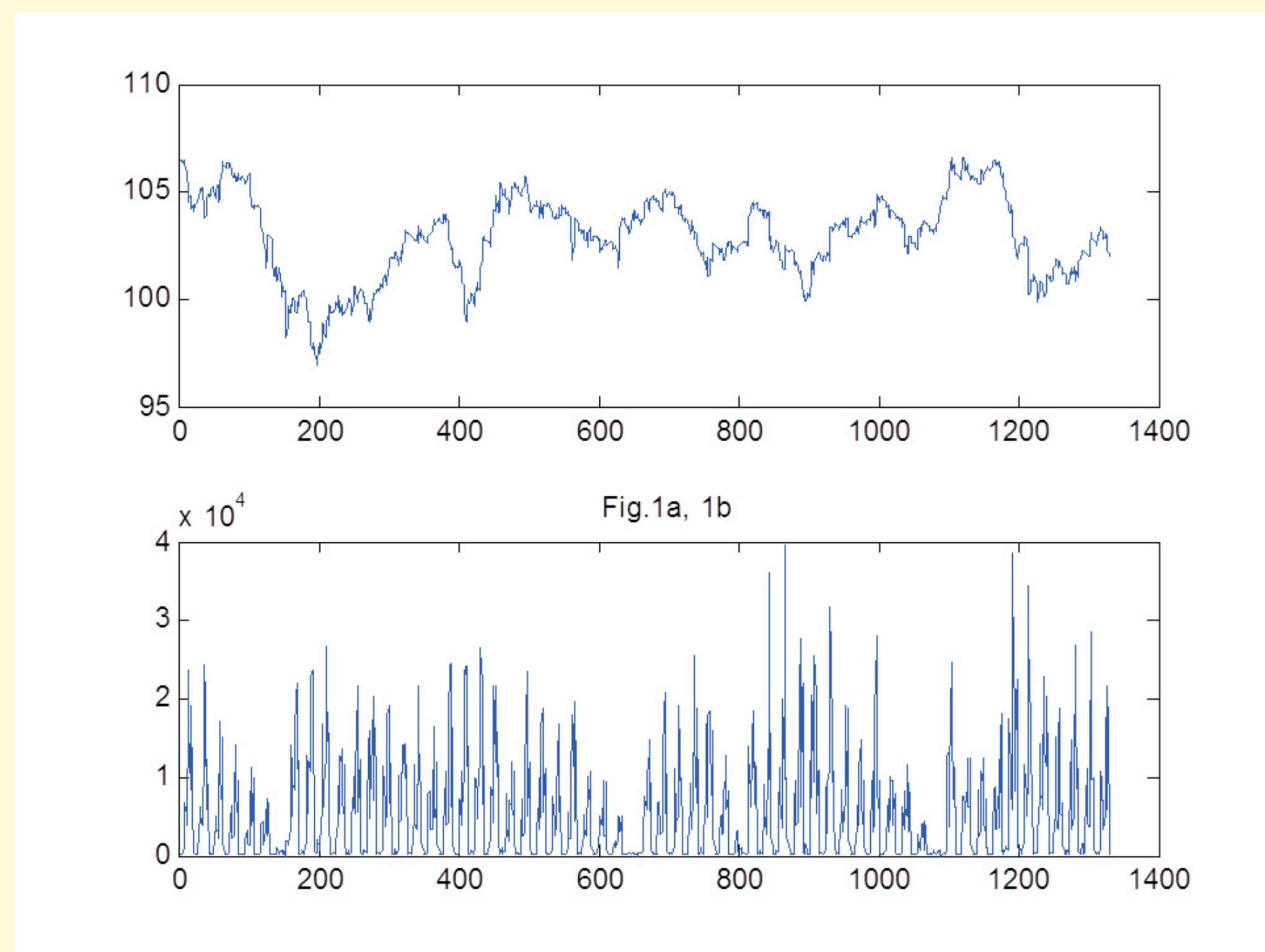
PRICE-VOLUME RELATIONSHIP IN INTRA-DAY DATA

Krzysztof Karpio, Piotr Łukasiewicz, Arkadiusz Orłowski

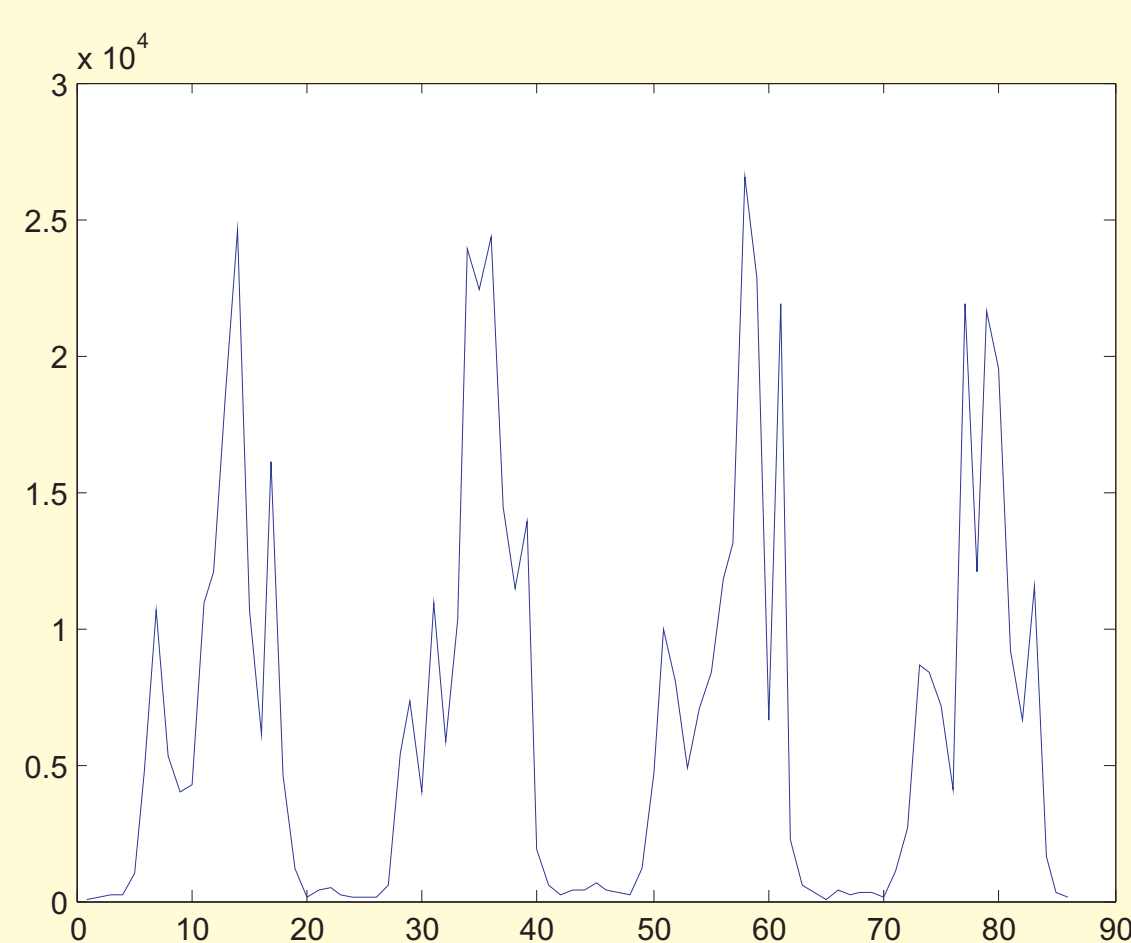
Warsaw University of Life Sciences - SGGW, ul. Nowoursynowska 166, 02-787 Warsaw, Poland

The dataset:

- 1st line Brent Data
- hourly data (01:00-22:00)
- from 2013-04-05 01:00 to 2013-06-28 22:00
- 1332 prices & volumes



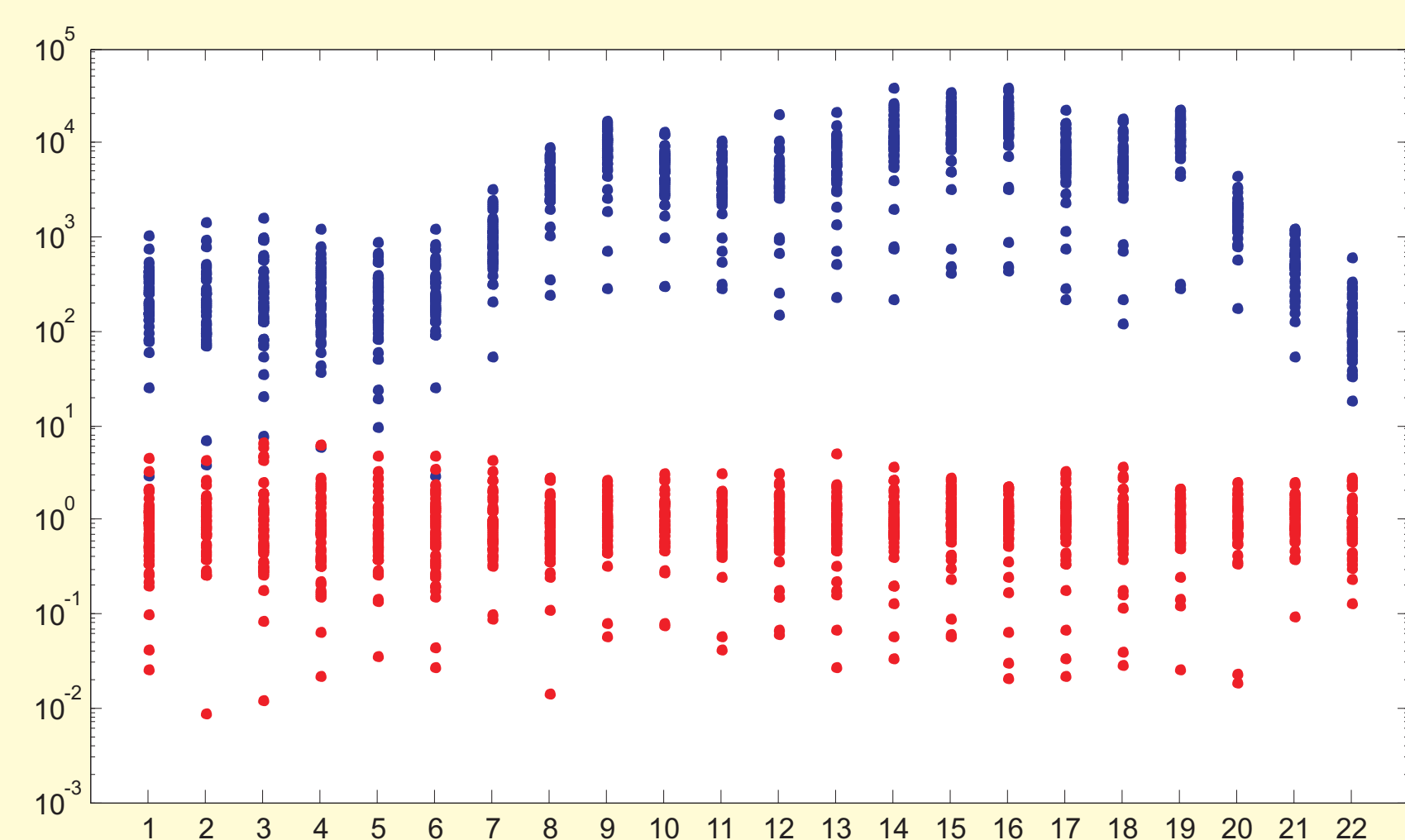
Price (top) and volume (bottom) time series



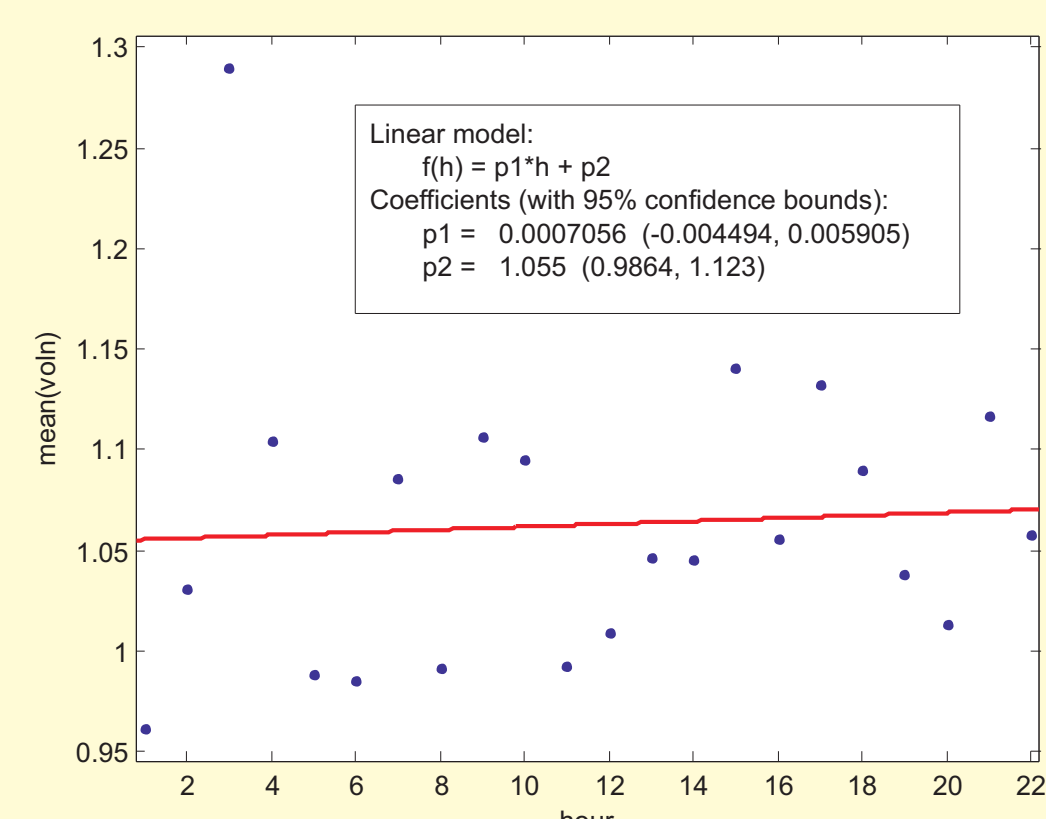
Hourly volumes for four successive days
Horizontal axis: data point #

Corrected volume series:

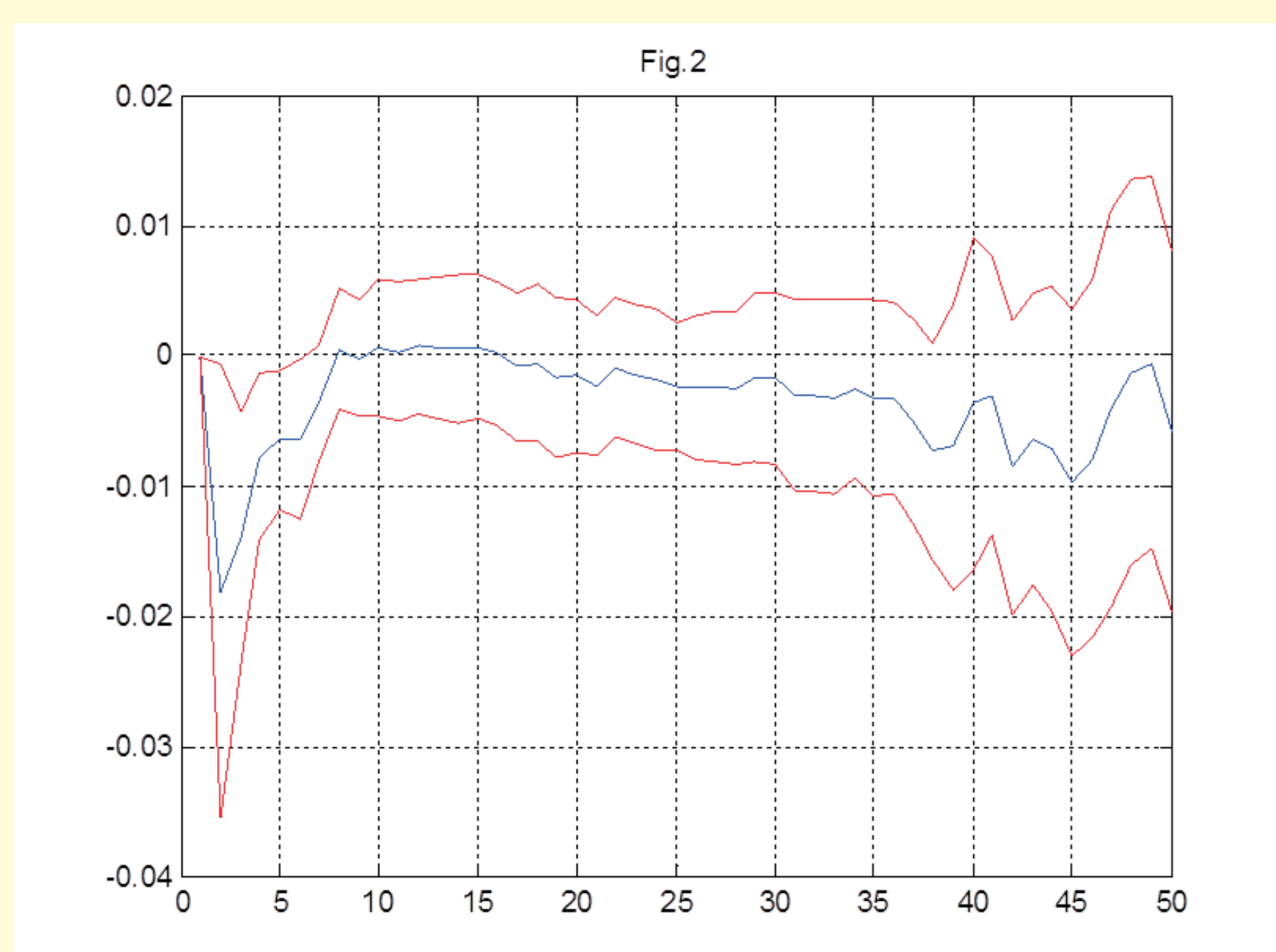
$$voln(i, k) = vol(i) / \text{mean}[vol(i-1), vol(i-2), \dots, vol(i-k)]$$



Volumes vs time before (top) and after (bottom) the correction for $k = 22$

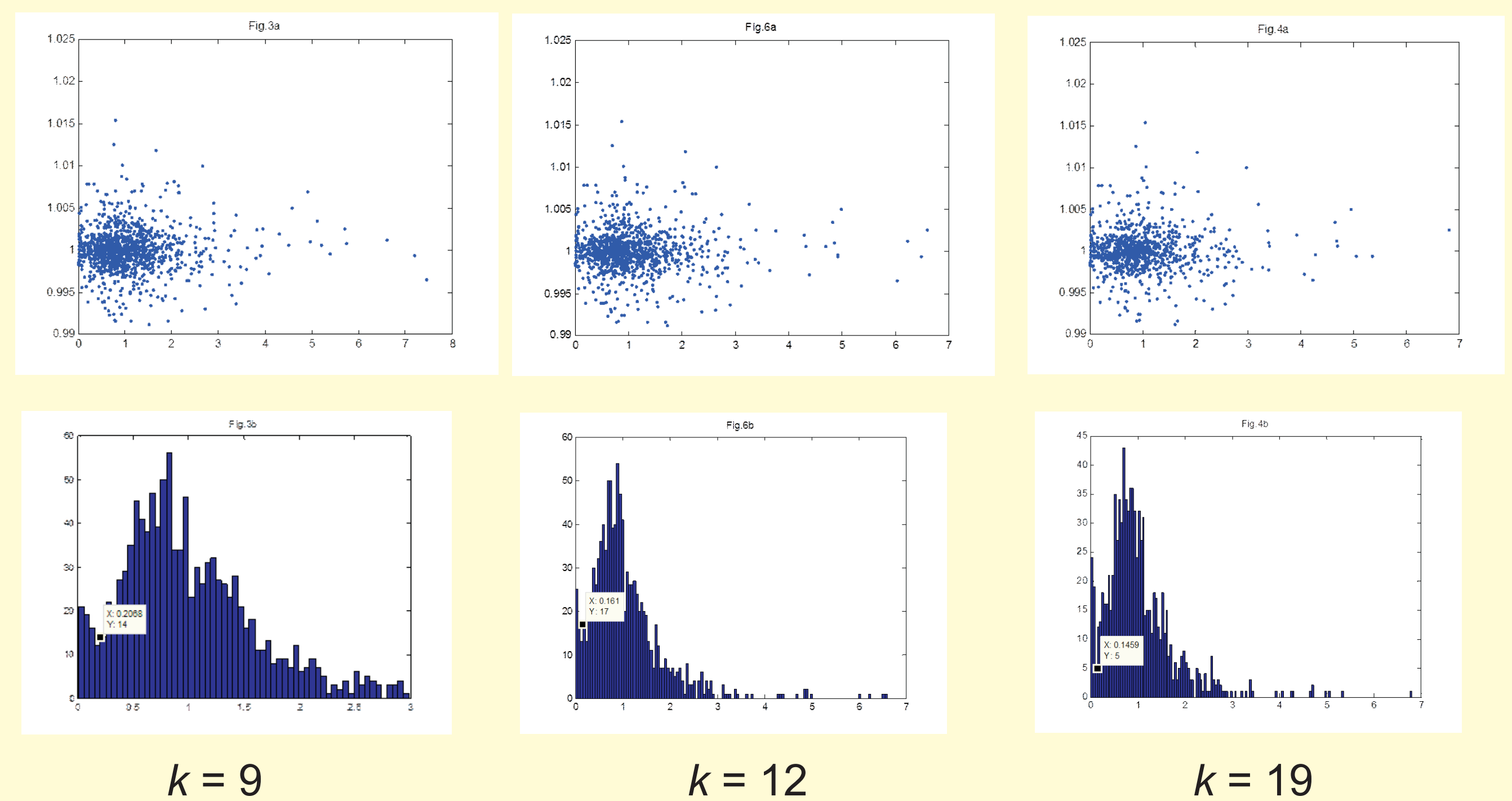


Mean values of corrected volumes ($k = 22$) for each hour with linear fit

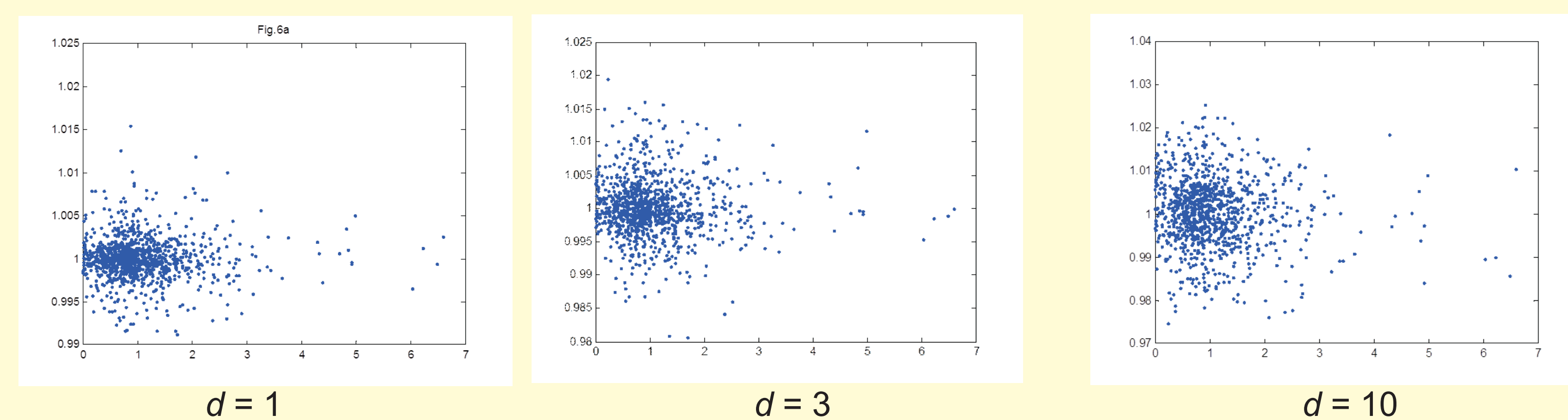


Slope parameter as a function of k (blue line) with 0.95 confidence interval (red lines)

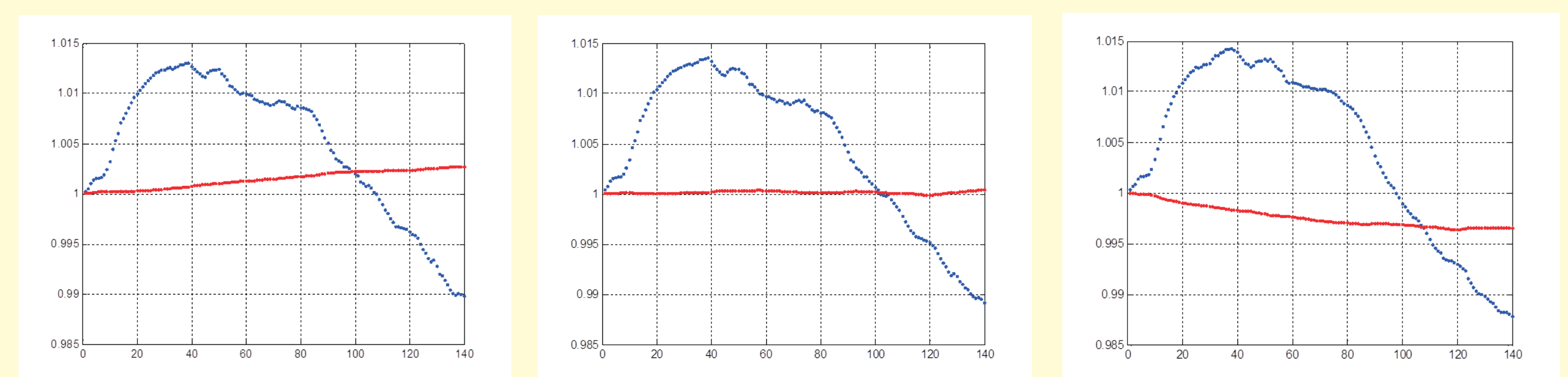
$$\text{Relative prices: } rp(i) = price(i+d) / price(i), \quad d = 1, 2, \dots$$



Top: one hour relative price ($d = 1$) vs corrected volume for various values of k
Bottom: distributions of $voln$ for various values of k



Relative prices for various values of d vs corrected volumes ($k = 12$)



Blue lines – mean relative prices for volumes < 0.17 as a function of d
Red lines – mean relative prices for volumes ≥ 0.17 as a function of d

CONCLUSIONS

- (1) Daily fluctuations have been overcome by utilizing the formula:
 $voln(i, k) = vol(i) / \text{mean}(voln(i-1, i-k))$
- (2) The above procedure has been verified. The $k = 9, 10, \dots, 20$ yield to the best results. The mean volumes for each hour are distributed uniformly
- (3) The mean relative prices for two sets of data ($voln < 0.17$ and $voln \geq 0.17$) were compared to each other as well as to unity for $d = 1, 2, \dots, 140$
- (4) The biggest differences between mean relative price for $voln < 0.17$ and unity were observed for $d = 40$
- (5) The biggest mean relative price was 1.015 for $k = 9$ and $d = 40$

REFERENCES

- Celik S. (2013) New Evidence on the Relation between Trading Volume and Volatility, Business and Economic Research, Vol. 3, No. 1, 176-186.
- Hussain S.M. (2011) The Intraday Behaviour of Bid-Ask Spreads, Trading Volume and Return Volatility: Evidence from DAX30, International Journal of Economics and Finance, Vol. 3, No. 1, 23-34.
- Abhyankar A., Ghosh D., Levin E., Limmack R.J. (1997) Bid-Ask Spreads, Trading Volume and Volatility: Intra-Day Evidence from the London Stock Exchange, Journal of Business Finance & Accounting, Vol. 24, No. 3 & 4, 343-362.
- Karpio K., Łukasiewicz P., Orłowski A. (2012) Price – Volume Relationship in Polish Stock Market, Acta Phys. Pol., Vol. 121, No. 2-B, B-61.