



# Asymmetry in the Subsequent Movements' Proportions of Share Prices Included in the WIG

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## Abstract

The intraday data of stock prices and time allow us to collect in the form of histogram the subsequent movements' proportions in price and time. Here we continue the previous work [1], where we investigated proportions of subsequent increasing and decreasing price movements and proportions of subsequent price movements in the same direction. Here we distinguish between the proportions with the growing and decreasing the latest price movement. We investigate quantitatively the effect of the breaking the turning point of resistance and support levels depending on the percentage size of price movements. In the same way we treat the main peak in the histogram for the equal price movements in the size or equal duration.

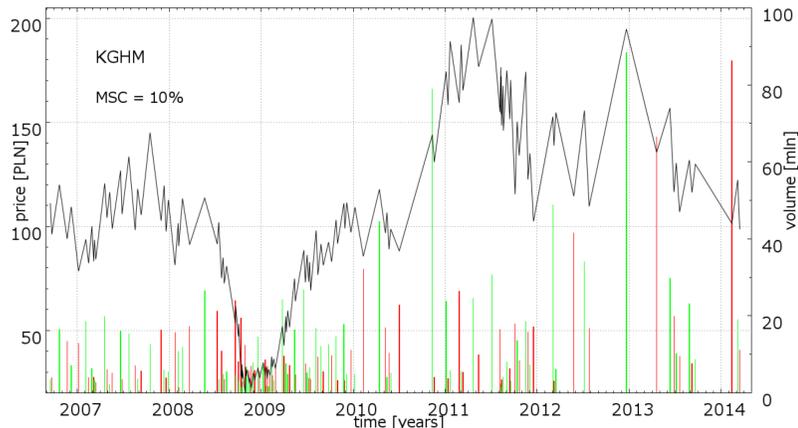


Figure 1: Price-time series for shares of KGHM with ignored price movements of less than the minimum size of correction = 10%.

A great number of impulse and correction proportions allow us to set them in histograms. Here we have two kinds of proportions as shown in (Fig. 2 and 3). The idea of how to simplify the price movements is based on the Point & Figure charts as described in [2] and Kagi charts, which was developed in Japan [3]. The price movements in the opposite direction, which are less than the fixed percentage (called here Minimum Size of Correction MSC) are ignored. So finally we have price-time series composed of turning points.

Additionally we introduce three conditions, so as to avoid price movements corresponding to the random fluctuations (for example realization of best buy and sell offers). When share price is less than 1 PLN, every percent of MSC corresponds to 0.01 PLN. The second condition:  $MSC > 0.50$  PLN. The third condition: every price movement should be composed of more than ten transactions. The example price-time series for shares of KGHM is printed on (Fig. 1).

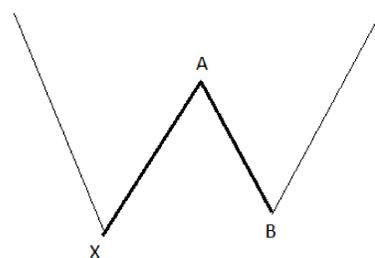


Figure 2: Measuring the price movement proportions in price and time. Here is the proportion of correction to impulse  $\frac{AB}{XA}$ .

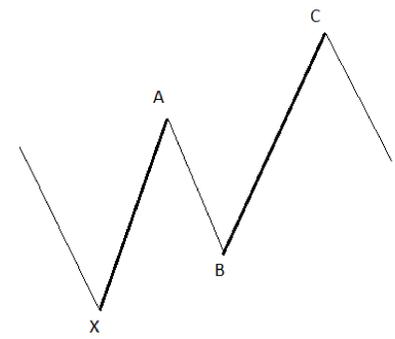


Figure 3: Here is the proportion of subsequent impulses  $\frac{BC}{XA}$ .

The proportions correction/impulse are set in histogram. Every case of such a proportion is placed in a narrow range of 0.01, forming a part of histogram. The same way is used for the duration of this price movements. On (Fig. 4) are placed two histograms for price proportions. This lines are well fitted by gamma probability distribution functions:

$$\Gamma_{\nu,\lambda}(x) = Cx^{\nu-1}e^{-\lambda x} \quad (1)$$

We have distinguished between the last price movements which are growing ( $AB > 0$ ) or decreasing ( $AB < 0$ ). We denote for growing last prices green lines and for decreasing the red ones.

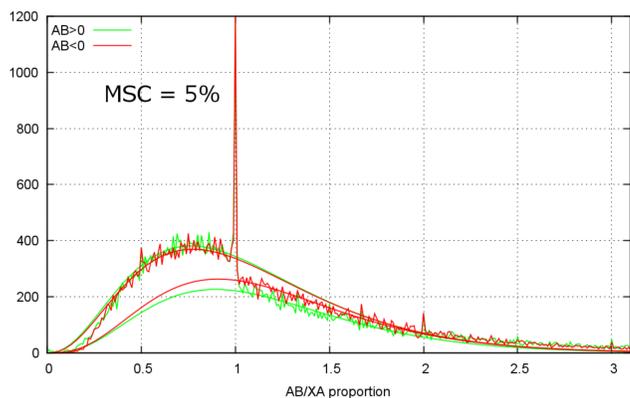


Figure 4: Two histograms for price correction/impulse proportions with gamma probability distribution functions fitted. In the histogram of price at 1 we have the sudden drop in probability of completing price movement. The probability rapidly decreases to 64% of the previous one while crossing 1.

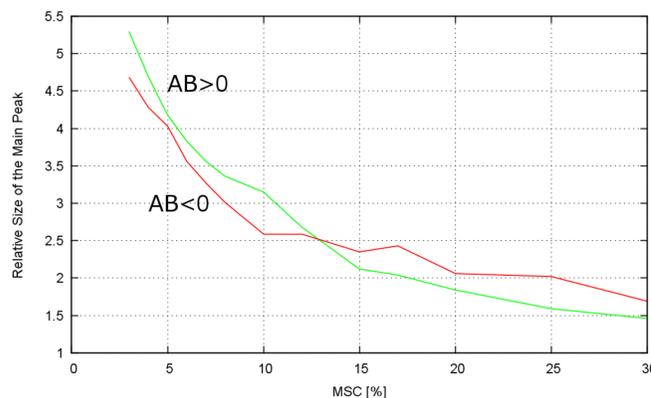


Figure 5: The relative value of the peak in comparison with adjoining numbers of proportions correction/impulse. In this peak the correction and impulse have the equal values.

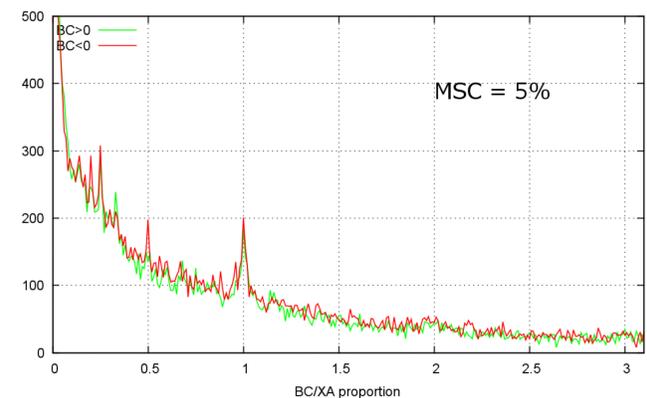


Figure 6: The histogram of subsequent impulses' price movement duration proportions.

## Conclusions

The effect of breaking the turning point resistance is presented quantitatively separately for the support and resistance levels. The effect is stronger for increasing prices (breaking the resistance). Generally the greater scale of price movement the lesser decrease of the probability. For subsequent impulses the effect of breaking the turning point resistance is smaller and for decreasing prices is negative in price movements greater than 10%.

## Bibliography

- [1] A. Szmagliński, Acta Phys. Pol. A 123, 621 (2013).
- [2] Thomas J. Dorsey, *Point and Figure Charting. The Essential Application for Forecasting and Tracking Market Prices*, John Wiley & Sons, Inc. 1995.
- [3] Steve Nison, *Beyond Candlesticks. New Japanese Charting Techniques Revealed*, John Wiley & Sons, Inc. 1994.

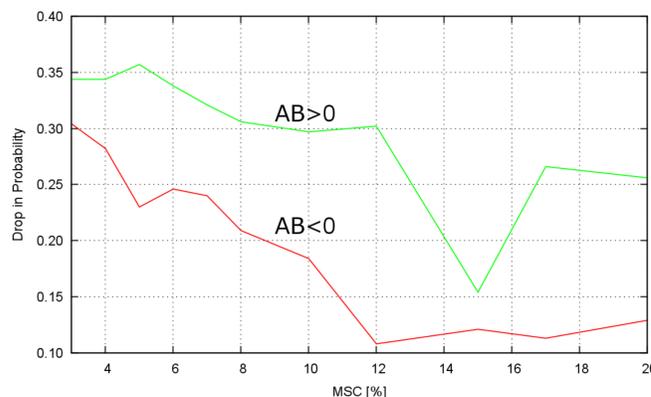


Figure 7: The effect of breaking the resistance. Here we have the ratio of transition from one probability distribution to the other depending on the magnitude of price movement.

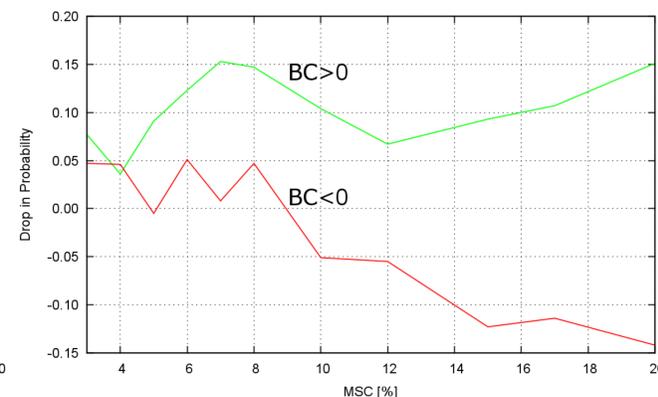


Figure 8: The ratio of transition from one probability distribution to the other depending on the magnitude of price movement for subsequent impulses.