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Title of the dissertation: **Application of deterministic chaos theory to the assessment of economic condition of companies listed on the Warsaw Stock Exchange.**

SUMMARY

The basic aim of this dissertation is to show how the deterministic chaos theory can be applied to the assessment of economic condition of the companies that are listed on the Warsaw Stock Exchange. Although the problem area in question has been extensively investigated, there still exists a research and knowledge gap in the literature of the subject, and no results have yet been published such as these presented in this study.

The research done by the Author of this dissertation along with the literature review made it possible to accomplish the primary objective adopted for this doctoral thesis along with the following theoretical, research, methodological and practical (implementation) goals.

Theoretical goals:

1. The identification and importance of the assessment methods of economic condition of companies.
2. The essence of deterministic chaos and its importance to fractal analysis of financial (capital) markets.
3. The essence and importance of Lyapunov exponents in fractal analysis of financial markets.
4. The essence and importance of the fractal and correlation dimensions in fractal analysis of financial markets.
5. The essence and importance of R/S analysis for the study of the memory in financial markets.

Research goals :

1. The identification and description of selected assessment methods of the economic condition of enterprises.
2. The identification of Lyapunov exponents based on selected companies listed on the Warsaw Stock Exchange.
3. The identification of fractal and correlation dimensions based on selected companies listed on the Warsaw Stock Exchange.
4. The identification of Hurst exponents based on selected companies listed on the Warsaw Stock Exchange.

Methodological goals:

1. Application verification of Lyapunov exponents for the purposes of fractality measurement of Polish listed companies and the determination of how fast the forecasting ability is being lost of the future behaviour of a listed company on the Polish Stock Exchange.
2. Application verification of fractal dimension for the purpose of quantitative account of phase space filling by a given object.
3. Application verification of correlation dimension for the purpose of determination of minimum variables that are needed to create a system dynamics model.
4. Application verification of R/S analysis for the purpose of identification of Hurst exponent for Polish listed companies.

Implementation goal:

1. The possibility and feasibility of the application of measures resulting from chaos theory for the purpose of estimation of investment attractiveness in the context of the economic condition of a given enterprise on the Warsaw Stock Exchange.

With the aforementioned objectives in mind, the main hypothesis was formulated that the economic condition of listed companies in Poland can be forecast using the deterministic chaos theory. This hypothesis was proved in the fourth, fifth and sixth chapter of the dissertation, and verified by means of its disaggregation into three specific functions (specific hypotheses). Specific hypotheses were then positively verified: positive Lyapunov exponents are fractality markers of the Polish listed companies and determine the pace at which forecasting ability is being lost as to the future behaviour of such companies on the Warsaw Stock Exchange. It is assumed in the dissertation that the companies listed on the Polish Stock Exchange exhibit positive Lyapunow exponents and are chaotic systems (H1). Stock Exchange quotations of the collapsing Polish listed companies have high fractal dimension compared to the companies that are in a good economic condition (H2). The quotations of the collapsing Polish companies display a low Hurst exponent compared to the companies in a good economic condition (H3).

There are the following components of the research process (addressing the above-mentioned objectives), finding answers to research questions and testing/verification of the hypotheses:

- Critical review and analysis of the literature of the subject made it possible to identify the research area and to study the concepts, phenomena and measures related to the adopted objectives and to verify the hypotheses;
- Empirical studies of a number of quotations of the companies listed on the Warsaw Stock Exchange.

Empirical studies have shown that the Polish capital market displays fractal properties. Importantly, investors and creditors may be interested in whether the economic condition of a listed company can be assessed using the methods proposed by deterministic chaos theory. Fractal analysis of selected companies listed on the Warsaw Stock Exchange that was conducted in the dissertation has revealed that the Polish Stock Exchange is characterized by long memory, which in turn allows the application of chaos theory methods. This dissertation therefore attempts to propose an innovative approach to the analysis of economic condition of the companies listed on the Warsaw Stock Exchange. The results obtained by the Author are not only interesting, but they also fill the knowledge gap regarding the application of chaos theory to the analysis of data about the functioning of listed companies. The practical directions set forth by the Author are by no means exhaustive; the solutions offered in this study are of future character and, despite being prospective and promising, are still arguable. For this reason, the complex issue under scrutiny requires further research.

Key words: Warsaw Stock Exchange, deterministic chaos theory, economic condition.