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AN ATTEMPT TO ANALYZE THE EVOLUTION OF SOME STOCK PRICES AT BVB (BUCHAREST STOCK EXCHANGE) USING STATISTICAL MODELS IN ARTIFICIAL MARKETS

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Abstract:
Throughout the history of modern portfolio theory, a lot of literature has tried to identify ways of constructing optimal portfolios, therefore it is of great interest to put in evidence a connection between statistical evaluation in econophysics and stock price changes in real markets. In this work such an analysis is conducted from an Ising-like statistical markets point of view.
Keywords: econophysics, Ising models, stock markets

1. Introduction

It was very interesting for us to find the existence of various market parameters describing the evolution of BVB, which have the same type of interdependence as the BVB indices.

2. Method

From the market parameters that describe the evolution of the BVB we considered the following pair:

$$M(t) = \frac{i(t)}{< i >_T} \qquad\qquad Q(t) = \frac{i^2(t) - < i >_T}{< i >_T}$$

where *i(t)* represents the market index, or, in the case of a specific traded company, the asset price at the *t* moment.

3. Results and discussions

In a previous article [3] we presented the M – Q dependence for the time sequence 2001 – 2003 for all the representative Romanian financial market indices: BET (the most

important traded stocks at BVB), BET-C (composite index for all listed stocks at BVB), BET-FI (the Investment Funds index containing 5 symbols: SIF1 Banat Crisana, SIF2 Moldova, SIF3 Transylvania, SIF4 Muntenia, SIF5 Oltenia) and RASDAQ. As it is shown in figure 1, there is evidence that for the BET, BET-C and RASDAQ indices the curves were very similar, having almost the same slope, but an exception was found for the BET-FI index.

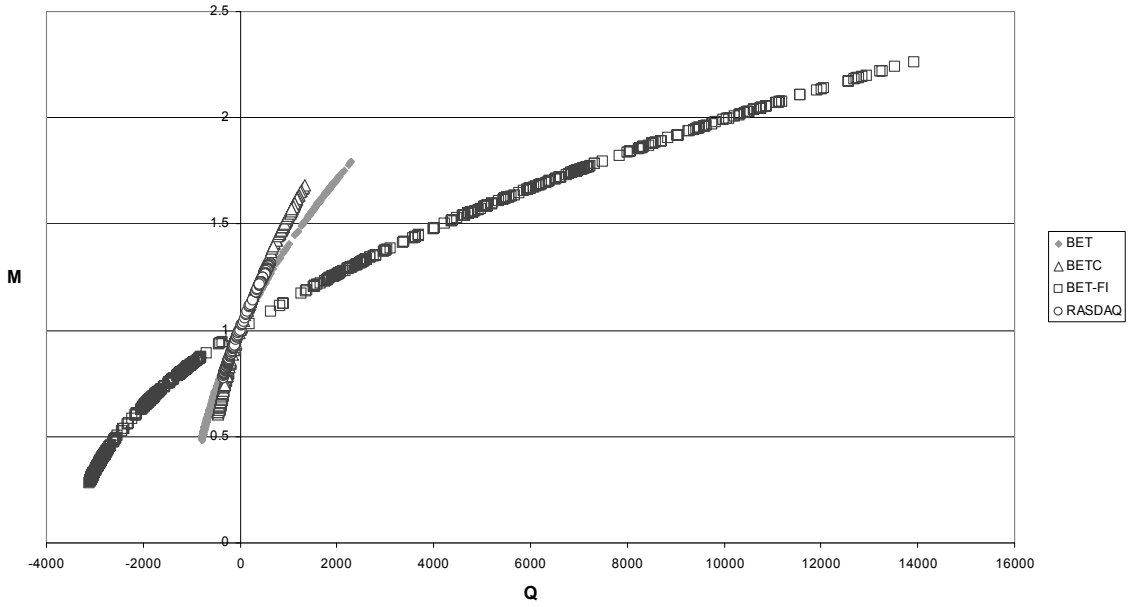

Fig.1 The M-Q dependency of the main indices for the 2001-2003 period

In another work [4] we realized how market evolution is reflected by comparing the M – Q dependence over 2 time periods: 2001 – 2003 and 01.01.2005 – 11.11.2005.

The aim of this article is to see if there is a possibility of obtaining significant information by comparing the M – Q dependence in the case of the financial evolution of the entire BVB market and the financial evolution of the most spectacular petroleum companies listed at BVB during the 01.01.2005 – 11.11.2005 period. The considered petroleum companies were: Petrom (SNP), Rompetrol Wellservices (PTR) and Rompetrol Rafinarie Constanta (RRC), the latter having some financially critical moments during the mentioned period.

The results are presented in figure 2. It is easy to observe that the M – Q curve for RRC has a different shape than the others, while the SNP and PTR evolutions are identical with the evolution of BET and BET-C respectively, which is included in BET.

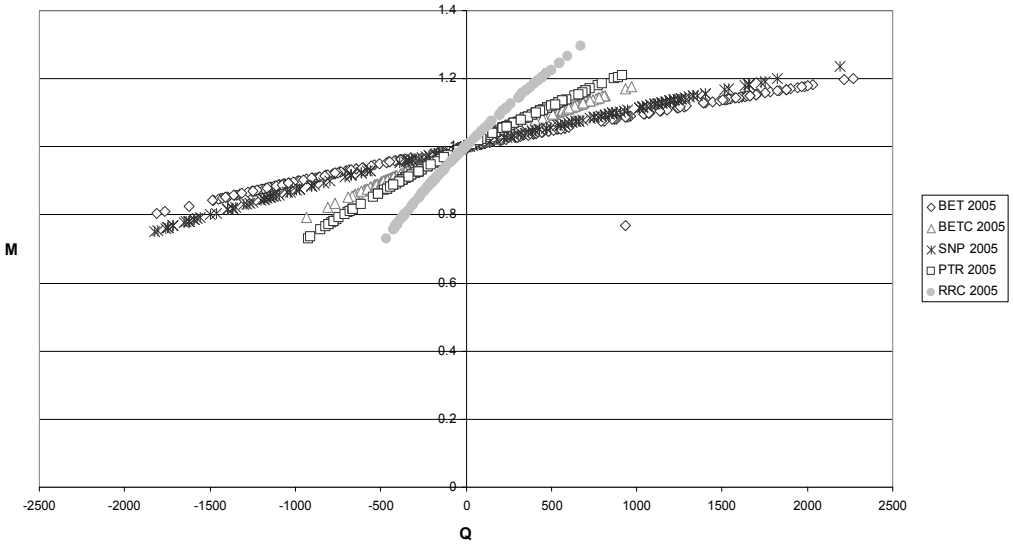

Fig.2 The M-Q curves for the main BVB indices and the petroleum companies in 2005

4. Conclusions

Taking into consideration the financial evolution during the 2005 year for the selected petroleum companies, there are two observations which result from the M – Q analysis:

1. The RRC evolution accomplished by some financial events during this period, is reflected in the same mode as the BET-FI evolution during the 2001-2003 period (see figure 1), when there were some major financial difficulties in the financial evolution of the Mutual Funds.
2. The two M–Q curves for the BET index and the SNP are almost the same, meaning that in the year 2005 this company is one of the most important titles traded at the BVB. For PTR, which appears only in the BET-C index, the M – Q dependence is similar with the BET-C curve.

In our opinion these observations reflect that there is a possibility of using the interdependence between some financial parameters (introduced in connection with Ising-like ordering parameters), for performing analysis of financial market evolution.

References

[1] T.Lux, M.Marchesi, *Nature* 397, 498 (1999)

[2] S.Bornholdt, *Int.J.Mod.Phys*. C12, 667 (2001)

[3] D.Andru Vangheli, *Analele UVT*, Seria Stiinte Fizice, 44, 106 (2003)

[4] D.Andru Vangheli, *Analele UVT*, Seria Stiinte Fizice, 46, 238 (2005)