The Impact of Trades on Daily Volatility: an Empirical Study for Romanian Financial Investments Funds

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Abstract. *The aim of this paper is to investigate the relationship between trade volume, number of transaction and daily volatility for Romanian Financial Investments Funds. There is a large debate on this topic. The empirical results of previous literature showed that there is a strong relationship between these varables. Using OLS regressions we found that trade volume has a larger impact on daily volatility compared to the influence of number of transactions which could be considered as a proxy for liquidity.*

Key words: volatility; trade volume; number of transactions; liquidity; capital market.

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1. Introduction

There is a large interest in how trading volume and number of transactions influence financial asstes' volatility on capital markets. A naive view is that the greater level of volume and number of transaction, the greater the price movement, and, consequently, the stocks volatility. On the other hand, a greater volatility could become atractive for investors which could generate high liquidity on market. In fact, previous literature did not show, clearly, the sense of the relationship between trading volume, number of transaction and volatility.

The aim of this paper is to investigate the impact of trading volume and number of transactions on daily volatility for Romanian capital market.

Taking into account the fact that Romanian capital market could be considerd as an emerging market which confronts many difficulties, such as the lack of liquidity, the results of our empirical testing could give some useful insights on this topic.

The paper is structured as follows: in Section 2 will be presented a short literature review. Section 3 will be devoted to the presentation of methodology and database. Empirical results will be presented in Section 4. The last section will consist in concluding remarks.

2. Trading volume, number of transaction and volatility – short literature review

Most of the previous studies investigated the relationship between trading volume, number of transactions and price movements, which it was considered as a crude measure of volatility (see in that sense, Kyle, 1985, Karpoff, 1986, 1987, Easley, O'Hara, 1987, Admati, Pfleiderer, 1988, Jain, Joh, 1988, Barclay, Litzenberger, Warner, 1990, Foster, Viswanathan, 1990, Brock, Kleidon, 1992, Barclay, Warner, 1993, Campbell, Grossman, Wang, 1993, Romer, 1993, Gopinath, Krishnamurti, 2001, Bjonnes, Rime, Solheim, 2003). The empirical testing mostly rely on a adjusted model proposed by Jain and Joh (1988), which considers trading volume as dependent variable and volatility (measured as stocks' price movements) as independent variable. The inverse relationship between volatility, as dependent variable, and trading volume, as exogenous, is not emphasized by previous study.

Therefore, we will investigate the impact of trading volume and number of transactions on stocks volatility using as example Romanian capital market. Having into consideration the fact that Romanian capital market is a young one and investors confront with many difficulties, such as the lack of liquidity, the empirical results could give some useful insights on this topic.

3. Methodology and database

In order to investigate the relation beteenn trading volume, number of transactions and volatility, we will use OLS regression, as follows:

$$V_t = \alpha + \beta \times T_t + \varepsilon_t \qquad (1)$$

where:

V_t = daily volatility at moment t, calculated as standard deviation based on market daily rate of return;

T_t = daily trading volume/number of transactions at moment t;

α, β = coefficients to be estimated;

ε_t = error term.

Taking into account the lack of liquidity of Romanian capital market, we will use daily observations for the five Romanian Investments Funds traded on Bucharest Stock Exchange (BSE). Volatility is calculated based on Romanian Investment Funds Index (BET-FI) as a standard deviation of daily rate of return on this market. The data for volatility, trading volume and number of transactions spanned between 2000, October 31st – 2008, August 28th.

4. Empirical results

The estimations for the relation (1) are presented in the table below:

Table 1

Estimated coefficients for OLS regressions based on (1)		
Dependent variable: Volatility	Regression (1) Independent variable: Number of transactions	Regression (2) Independent variable: Trading volume
α	0.012472 [6.33] (0.00)	0.010297 [17.95] (0.00)
β	0.000000235 [16.83] (0.00)	0.000000000114 [11.54] (0.00)
Statistics	R-squared: 0.02	R-squared: 0.10
	F-stat: 49.69	F-stat: 207.84
	Prob: 0.00	Prob: 0.00
[ ]: t-statistic ( ): probability		

The estimations based on OLS show that number of transactions, as a proxy for market liquidity, and trading volume influence daily volatility, from statistical point of view. But, their impact is very small. In the first case, number of transactions could explain only 2% of daily volatility, and β is almost close to zero, but it is different from zero. In the second case, trading volume could explain 10% of daily volatility, but impact is much smaller than in the first case.

In order to show the small impact of number of transactions and trading volume on daily volatility, we proceeded on estimating a second regression based on lagged values of daily volatility, as follows:

$$V_t = \delta + \gamma \times \sum_{i=1}^{n} V_{t-i} + \eta \times T_t + \mu_t \qquad (2)$$

where:

V_t = daily volatility at moment t, calculated as standard deviation based on market daily rate of return;

V_{t-i} = lagged values of daily volatility at moment t-i;

T_t = daily trading volume/number of transactions at moment t;

δ, γ, η = coefficients to be estimated;

μ_t = error term.

The results of estimation based on OLS are presented in the table below:

Table 2

Dependent variable: Volatility	Regression (1) Independent variable: Lagged daily volatility, Number of transactions	Regression (2) Independent variable: Lagged daily volatility, Trading volume
	Estimated coefficients for OLS regressions based on (2)	
δ	0.0093 [11.99] (0.00)	0.0079 [12.24] (0.00)
γ	0.23 [6.62] (0.00)	0.19 [5.14] (0.00)
η	0.00000087 [4.88] (0.00)	0.0000000000981 [9.38] (0.00)
Statistics	R-squared: 0.08	R-squared: 0.13
	F-stat: 80.86	F-stat: 144.28
	Prob: 0.00	Prob: 0.00
[ ]: t-statistic ( ): probability		

As could easily be noticed, by adding lagged values of daily volatility, the regression improved, according to R-squared values. Consequently, it shows that our previous remarks are correct, and number of transactions and trading volume has a small impact on volatility.

The results obtained within this paper, also, reveal some insights related to investors' behavior on Romanian capital market. It seems that liquidity is not an indicator based on which investors take investment decision. Generally speaking, a rational investor takes into account for his/hers investment the liquidity of financial assets that he is about to trade. In our case, investors' investment decisions are driven by the traded quantity of stocks and not by liquidity.

In fact, trading volume has a significant influence on number of transaction, as could be seen from OLS estimation below:

Table 3

Dependent variable: Number of transactions	Independent variable: Trading volume (Tr_vol)
	The correlation between number of transactions and trading volume
c	921.06 [10.15] (0.00)
Tr_vol	0.000166 [10.08] (0.00)
Statistics	R-squared: 0.45 F-stat: 1497.61 Prob: 0.00
[ ]: t-statistic ( ): probability c: intercept	

The estimations show that trading volume could explain almost 45% of number of transactions. Consequently, liquidity on Romanian capital market could be influenced by the quantity of stocks traded, and this fact could be considered as a characteristic for Romanian capital market.

5. Concluding remarks

The aim of this paper was to investigate if liquidity and trading volume influence daily volatility on Romanian capital market. The previous literature showed that there is a strong relation between those variables, but they used proxy for volatility and considered the correlation only in one sense.

Based on daily observations for Romanian Investments Funds which are very liquid from the stocks traded on Bucharest Stock Exchange, we revealed that number of transactions and trading volume has only a small impact on daily volatility. Moreover, we showed that

trading volume has a significant influence on liquidity. Consequently, these results give insights on investors' behavior on Romanian capital market. It seems that their investment decisions are based on information about stocks quantity traded on BSE and not on liquidity.

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