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Study of the Dynamics of Asset Prices by a Behavioral Approach: Theoretical Foundations & Empirical Investigation

Mr. Nizar El Ouni

Faculty of economics and Management of Sfax, Research Unit: Corporate Finance and Financial Theory [COFFIT]

Abstract: ***We study; according to the work of Statman, Thorley & Vorkink (2004), Glaser & Weber (2004) and Chuang and Lee (2006), the dynamic relationship between overconfidence of investors and volume of transactions. This study aims to show first that overconfidence is a systematic cognitive bias most investors suffered the effect of which can affect the efficiency of financial markets. We test this hypothesis for a sample of 35 Tunisian companies over a period from 2000 to 2010 according to frequency: daily, weekly and monthly and using a range of econometric tests or tests of Granger causality, then the vector autoregression VAR modeling and impulse response functions associated. We prove the presence of excess of confidence in the Tunisian market through a significant relationship Granger returns to the current market volume of transactions. In addition, we can test the hypothesis that overconfidence allows encourage the volume of transactions. Still more, and the fact that these results support the hypothesis of the disposition effect, we argue our study distinguishing overconfidence of this bias. Following the positive and significant relationship between past market returns and individual trading volume in the presence of individual past performance, we can validate the overconfidence hypothesis and to distinguish it from the effect of this provision which allows to conclude that the exchange market activity is not a simple summation of disposition effect individual securities.***

Keywords: Behavioral Finance, Over-confidence, Excessive Volatility, VAR market, VAR individual securities, Causality, Functions pulse responses.

1. Introduction

The dynamic relationship between stock returns and trading volume was the subject of much research in the financial literature since the 1950s yield and volume are two main pillars around which revolves the entire stock market (Mahajan and Singh, 2009). With the emergence of the hypothesis of market efficiency in the 70s, the role of price variability has increased considerably. Indeed, the relevance of a financial market is the ability of prices fully reflect all available information on past, present and future events. In other words, the market is informationally efficient if all the useful information in the evaluation of listed securities is reflected automatically reflected in the price. So the market is a vast hub of information. Quality traffic, transmission or dissemination of this information depends on the efficiency of the market. In terms of its impact on the characteristic quantities of the economy and its performance, it is in the interest of modern economies to achieve efficiency in the dynamics of stock markets. However, the movements in the stock market cannot be determined only by focusing only on the univariate price dynamics. The study of stock prices without being associated with trading volume can transmit only vague information about the trading activity of the market (Mahajan and Singh, 2009). It is well established in the literature that prices react to the arrival of new information and the volume of transactions is considered essential information, which indicates the direction that should take prices. This means that the volume is an important indicator to predict market trends. We can therefore conclude that trading volume plays an important role in informing the market. Therefore, according to Harris and Raviv (1993) trading volume reflects the information on changes in prices and the agreement in investor expectations. The study of the joint dynamics between returns and trading volume is therefore of paramount importance in that it sheds light on the understanding of the microstructure of the stock markets and therefore to highlight the level efficiency of those markets.

In addition, two stylized facts have long attracted the interest of academic researchers in the literature of financial markets, it is the variation in time of the conditional volatility and the persistence of the volatility of returns (Gursoy & al. 2008). One argument used by these authors to explain the time variation of the conditional volatility is based on the idea that asset returns are generated from a mixture of distributions hypothesis in which the stochastic variable mixture is considered as the arrival rate of market information flows. This implies that the volatility of returns is proportional to the rate of arrival of information, providing an explanation for heteroscedasticity yields observed. Such an explanation suggests according Luu and Martens (2003) that changes in daily prices and trading volume are caused by the same underlying latent variable which is the arrival rate of market information. This implies that the performance and volume vary simultaneously in response to new information. In these circumstances there is a positive contemporaneous relationship between returns and trading volume. Compared to the persistence of volatility, Lamoureux and Lastrapes (1990) also link the observation of this phenomenon in the mixture of distributions hypothesis and suggest that the persistence of the conditional volatility in stock returns (GARCH effects) reflects a serial correlation in the arrival rate information. The combination of volatility is also an important property usually observed in financial time series. It is known as a situation where large variations in prices tend to be followed by changes in the same sizes, and small price changes tend to be followed by changes in the same magnitudes.

Grouping in the presence of volatile, squared series yields should be very autocorrelated. In this context, the autoregressive conditional heteroskedasticity in Engle (1982) and its extension, the autoregressive conditional heteroskedasticity widespread Bollerslev (1986) (GARCH) is used to understand these phenomena in stock markets.

In total, whatever the approach, the general consensus in the literature of trading volume and the volatility of returns to date, there is a strong link between the volume of current transactions, performance and volatility conditional. Because understanding this link could help to distinguish between the different hypotheses on the structure of the market and eventually lead to better forecasting of volatility, further exploration of this relationship worth pursuing especially when is emerging and less developed stock markets of Africa. On this basis, the aim of this article is to provide additional evidence from the relationship between trading volume, returns and conditional volatility. Our study explores the transaction volumes and yields daily indices of the Tunisian stock market.

2. The Relationship Between Overconfidence and the Volume of Transactions: Literature Review:

Different investors who operate on stock selections in the financial markets generally face difficulties in terms of expectations and it is for this reason that the bias of over-confidence can take place and will be more pronounced. In this sense, the work of Griffin & Tversky [1992] empirically validated this hypothesis. Although at this level, a degree of trust is required in order to manage its portfolio that models developed in terms of assessing the financial markets radically integrate the concepts of management capacity as well as anticipation. In fact, in the context of a traditional financial environment in which the transaction costs are positive; an investor; where it is considered perfectly rational, will react by placing his position if and only if the gain from this transaction will exceed the costs incurred. In an opposite case, by introducing the concept of behavioral finance that financial officers are supposed irrational, we can always attend a power position even if these costs are higher than expected gains: what is the impact bias over-confidence which is reflected in the estimate erroneously the extent of the profits hoped for. Similarly, this bias can be seen in the fact that an investor will select its securities while referring to his private information that will be overestimated in terms of accuracy and also in terms of treatment by the investor himself.

To better clarify this behavior remains important in explaining the different financial decisions .We are interested in the study by Odean (1999) where the author used to compare the profitability of purchased with the securities sold by the securities all individual investors. In fact, the study of the profitability of the choice of investor portfolios has enabled the author to conclude that; whatever the period of study; we always distinguish an excess of the cost of securities sold compared to that of the securities purchased. So it turns out that this decision by investors is not optimal because it is always present the same results regardless of the financial system costs (either in the presence or out of transactions costs). So in addition, the volume of trade carried seems unjustified and this can show, in other words that over-confident investors overestimate the precision of their information: where Odean [1999] leads to two main phenomena: an increase in the frequency of portfolio adjustment either excessive trading securities.

In this sense, Odean able to detect a remarkable increase in the rate of rotation of investors to an extent of 20% (75.5% to 95.5%) due to a change in the traditional management by another online: this finding seems to support the hypothesis that overconfidence individual investors explains much the excessive volume of trade recorded in the financial markets. In the same vein, Barber and Odean [2002] tried as part of their research, testing all possible link between investor behavior and performance. Investors opt for portfolio management online against conventional management. The purpose of the study is therefore to conduct an analysis of the operations performed by a wide range of investors (ie investors in 1607). The study of this problem proves the existence of the bias of over-confidence investors blow and this is manifested especially if they manage to achieve good results before the change in management regime (traditional to online) because they think that their success came thanks to their competence in terms of anticipation as in the case of failure, they attribute this type of result to bad luck or other factors [Miller & Ross].

In the same vein, investors believe that their behavior and personal opinions have a very significant impact on the achievement of favorable [Langer & Roth 1975] events. The fact that an investor makes his choice of titles without a financial intermediary (eg telephone conversation) will feel more involved and thereafter any illusion of control may lead eventually to a higher frequency of exchanges. To test the hypothesis that overconfidence positively influences the volume of transactions positively Statman, Thorley & Vorkink [2004] conducted a study on the US market with their results confirmed this hypothesis. Moreover, the work of Glaser & Weber [2004] which are to study the same phenomenon but financial examining the hypothesis those over-confident investors make more transactions than rational investors. They showed a significantly positive relationship between excess CBMs (unrealistic optimism, illusion of control, poor calibration ...) and measures of trading volume of individual investors (number of transactions carried out, turnover ...). The authors confirmed the hypothesis that highlights the relationship between overconfidence and trading volume while applying the test of correlation measures over-confidence (psychological variables) and measures of trading volume (variables economic).

It therefore follows that all individual investors on the financial market remain overconfident [which is in agreement with the results of Barber and Odean 2002]. Also, Glasser & Welber [2004] come to directly test the relationship between overconfidence and the volume level transactions are via a methodology that examines the relationship between two variables outfits: are economic and psychological variables. In the same vein, Wen-I Chuang & Bong-Soo Lee [2006] tested the same hypothesis but

examining investor reaction to the publication of the new information they have shown that investors over-react to any private information while they under-react to the category of public information which leads to an excess of the volume of transactions explained largely by the speed of reaction of investors face information [Odean, Daniel, Hirshleifer & Subrahmanyam 1998 and Chuang & Lee 2006] . Therefore, we conclude from the work done in the sense that the impact of private information is more pronounced compared to the public. Thus, empirically, the realization of gains on the financial market makes over-confident investors more aggressive in terms of trade made in subsequent periods and vice versa.

The second axiom of research has been dedicated to study the causal relationships Granger [1969.1988] between trading volume and returns: This study attempted to examine the type of relationship that may exist as well as impact of overconfidence on the total volume of transactions depending on economic conditions. In fact, the author has shown that the impact of overconfidence bias is more pronounced after a period of economic growth according to GARCH. Therefore, it has been shown that the self-assignment effect considerably excessive volatility feeds through complacency. In this regard, we can mention the methodology of a directly administered questionnaire used by Glasser & Weber in 2004 that tests the link between excess confidence-building measures with measures of trading volume. The results are more accurate. Another distinction empirical order took place in the work of Chodia Lo & Wang [2000] who have attempted to address the relationship between trading volume and actual returns then it should be noted at this level , little empirical work of previous research examining the current volume of transactions with past performance: the methodology to be adopted in the next section where we will try to deliver again the phenomenon studied through the frame in the application of a set of econometric models (causality test, ADF test of stationarity, estimation of the VAR model, the impulse response functions) in the Tunisian market.

3. Methodology & Results

1) Sample & Study Data:

As part of our research, we try to test the hypothesis of overconfidence explained by the volume of transactions on the Tunisian stock market. Our study is to examine the relationship that can occur between stock returns and trading volume in a sample of 35 listed companies, part of the overall index TUNINDEX: we focus on daily observations, weekly and monthly over a period of eleven years; is January 2000 to December 2010. In fact, we need for each share of its course, its rate of rotation (this is a measure of the volume of transactions) and finally its market capitalization*. The observations are constructed from daily data for the stock market in Tunis (securities exchange of Tunis) [Table 1].

2) Modeling and Identification of variables:

a) Causality Relationship

We proceed empirically verify the existence of a positive relationship between the values of stock returns and trading volume by applying the Granger causality test in 1969 and 1988. This kind of test is based on the principle that future cannot cause the present or the past. In other words, past performance R_t cause the volume of transactions V_t within the meaning of Granger if the prediction V_t (with the use of past performance) is more accurate than the prediction without using these returns both in terms of error variance $\left[\delta^2\left(V_t/\Omega_{t-1}\right) < \delta^2\left(V_t/\Omega_{t-1} - R_t\right)\right]$ where Ω_t is the set of information available. It is also important to mention the existence of other current financial literature that relationship into question another way, ignoring the existence of a significant relationship between trading volume and stock returns. We distinguish the arrival of sequential information Copland [1976] which proposes a positive relationship bidirectional causality between the values of the associated returns and trading volume model: either as it was mentioned in both directions. We note a relationship of feedback. Our empirical investigation allows us to distinguish the basic assumption of overconfidence face the alternative hypothesis of the volume of transactions; where the causal bivariate writes as follows:

$$V_t = \alpha_{V_1} + \beta_{V_2}\left|R_{mt}\right| + \beta_{V_3} MAD_t + \sum_{j=1}^{P} a_j V_{t-j} + \sum_{j=1}^{P} b_j R_{t-j} + \varepsilon_{V_t} \quad (1)$$

$$R_t = \alpha_{R_1} + \beta_{R_2} MAD_t + \sum_{j=1}^{P} c_j V_{t-j} + \sum_{j=1}^{P} d_j R_{t-j} + \varepsilon_{R_t} \quad (2)$$

Avec V_t : Volume weighted market transactions.

R_t : Weighted Efficiency market.

$\left|R_{mt}\right|$: The absolute value of the weighted market returns at time t.

MAD_t : The standard cross-type (daily, weekly and monthly) returns at time t.

Under the test of bivariate Granger causality, formulating hypotheses is such that the rejection of the assumption (or null hypothesis) postulates that values Past performance does not cause trading volume $H_0 : b_j = 0 \ \forall$ j who favor the hypothesis of overconfidence. While the alternative hypothesis translates $H_1 : c_j = 0 \quad \forall$ j . We suggest that the direction of causality is the volume of transactions to yields. A third scenario may take place by examining this relationship; or both coefficients b and c are significant it is to say the two parameters studied have an impact on each other when we see a causal relationship in either direction: this universally designated by "relationship feedback relationship "between the values of returns and trading volume corroborates the assumption of sequential

information arrival otherwise the assumption of positive feedback trading.

b) VAR Model

To review and assess the relationship of interaction between trading volume and stock returns, we perform a vector auto regression model (VAR) because this kind of model allows us to describe the dynamics of different relationships may take place between all variables studied without taking into account assumptions on the coefficients of these parameters, formally:

$$Y_t = \alpha + \sum_{k=1}^{K} A_k Y_{t-k} + \sum_{l=1}^{L} B_l X_{t-l} + e_t \qquad (3)$$

Knowing that the vector Y_t of dimension $(n \times 1)$ observations for a period t is endogenous variables such as the volume of transactions (V_t) and volume yields (R_t). Also, we assume another vector of observations X_t of the same period t with exogenous variables e_t while is a residual vector dimension $(n \times 1)$. A_k and B_l are the regression coefficients that estimate relationships between time series of exogenous and endogenous variables studied while assuming the existence of K number of lags of the endogenous observations and delays in L exogenous observations. This model is to consider a VAR covariance structure that may exist in the vector, which detects residues; further term; contemporaneous correlation between endogenous variables. Formally, the theories of overconfidence does not allow you to specify a time study between returns and turnover, it is for this reason and before any treatment provided as part of this empirical investigation, it would be wise to determine the optimal number of delay to remember* *(*In this regard, we consider the estimation of all VAR models with the total number of delay to be selected according to the type of data: for example is 12 for monthly data. The number of delay to be used is the one that minimizes both Akaike criteria (AIC) and Schwarz (SC) for each estimation).* The empirical part is based on two versions of the VAR model: the first on the market; VAR is the market while the second VAR modeling of individual securities will be applied to each security in our sample.

c) VAR Market

This first modeling VAR market contains two endogenous variables (trading volume & market performance) as well as two exogenous variables (temporal volatility of returns as noted by $|R_{mt}|$ the standard deviation of returns cross by noted MAD_t); is the following entry:

$$\begin{bmatrix} V_{m;t} \\ R_{m;t} \end{bmatrix} = \begin{bmatrix} \alpha_{V_m} \\ \alpha_{R_m} \end{bmatrix} + \sum A_K \begin{bmatrix} V_{m;t-K} \\ R_{m;t-K} \end{bmatrix} + \sum B_P \begin{bmatrix} |R_{m;t}| \\ MAD_t \end{bmatrix} + \begin{bmatrix} \varepsilon_{V_{m;t}} \\ \varepsilon_{R_{m;t}} \end{bmatrix} \qquad (4)$$

The parameters that describe this model are:

$V_{m;t}$: Volume of transactions described by the weighted market turnover at time t.

$R_{m;t}$: Yield weighted market at time t.

$|R_{m;t}|$: Absolute value of the weighted return of the broad market at time t.

MAD_t : The standard deviation of returns cross (daily, weekly, monthly) at time t.

Such a significant and negative relationship between the variables put in question can be explained by the behavior of investors will react in a less intense way to change any negative returns recorded in the financial market which will result in a reduction of the level of confidence. Also, we can attribute this finding to the fear of the various stakeholders in the financial market to realize losses that will cause them to delay the sale of certain securities from their portfolios (Losers). At the end of two applications previously proposed alternatives, we distinguish between the hypothesis of overconfidence of Gervais & Odean [2001] that of the disposition effect of Shefrin & Statman [1985] that the first hypothesis postulates that transactions are connected in general, while the second effect is considered as a simple description of the attitudes of investors toward specific securities in their portfolios. The study of the activity of individual securities transactions will allow us to clarify these two theories via the distinction of our basic assumption called the impact of excess through reliance on the trading volume of the alternative reflecting the disposition effect: it is for this reason that we use the second version of the VAR model to each security in our sample consists of 35 stocks listed on the Tunisian stock market.

d) VAR Individual Titles

VAR modeling on each title contains a case study for our three endogenous variables are the volume of transactions (turnover) of Title i, the return of security i and the market return. We distinguish one exogenous variable; either the temporal volatility of returns in absolute terms $|R_{m;t}|$. Formally; we have:

$$\begin{bmatrix} V_{i;t} \\ R_{i;t} \\ R_{m;t} \end{bmatrix} = \begin{bmatrix} \alpha_{V_i} \\ \alpha_{R_i} \\ \alpha_{R_m} \end{bmatrix} + \sum A_K \begin{bmatrix} V_{i;t-k} \\ R_{i;t-k} \\ R_{m;t-k} \end{bmatrix} + \sum B_P \begin{bmatrix} |R_m| \end{bmatrix} + \begin{bmatrix} \varepsilon_{V_i} \\ \varepsilon_{R_i} \\ \varepsilon_{R_m} \end{bmatrix} \qquad (5)$$

To judge through overconfidence and the disposition effect, as explanatory factors in the volume of transactions, we will have positive coefficients in the regressions of turnover on individual securities market returns and past on past returns of securities. This version of the VAR individual securities can distinguish two psychological biases studied in trying to ensure that the disposition effect is not the sole responsibility of explaining the exchange activity.

4. Results and Interpretations

4.1 Study of Stationary

To check the stationarity of the series studied, we try to use the Augmented Dickey Fuller (ADF). The principle of this test is to detect the presence of a unit of a root in the three models. In order to apply the Granger causality test should be taken at first to check the stationarity of the following parameters: weighted market return $R_{m,t}$, weighted rate of rotation of the market ($T_{m,t}$). This analysis will be conducted for a daily horizon, weekly and monthly. The VAR model in its version of the market requires verification da stationarity of the series ($R_{m,t}$) and ($T_{m,t}$) on the endogenous and the absolute value weighted market return variables ($|R_{mt}|$) and standard deviation of returns cross (MAD_t) variables reflecting the exogenous. While the application of VAR modeling associated with each share of 35 shares of our sample requests verification of the stationarity of the three endogenous variables are ($R_{m,t}$); ($R_{i,t}$) Dividend yield i ($T_{i,t}$) turnover of stock i and a single exogenous variable; or ($|R_{m,t}|$). This analysis will be conducted primarily for a daily horizon. We distinguish the following results; from the application tests on the different sets stationarity of variables described below; reported in the following table:

Table 2: ADF test of Stationarity (Daily Frequency)

Variables	*Statistics Calculated ADF*	*Critical Statistics **		
		1%	*5%*	*10%*
TMP_t	-15,77925	-3,8527	-3,3368	-3,0989
RMP_t	-16,85361	-3,5689	-2,8653	-2,6013
VABS**	-14,96523	-3,8652	-3,3965	-3,1139
MAD_t^{***}	-15,33291	-3,8652	-3,3965	-3,1139

* Critical values for rejection of hypothesis of a unit root.
** Absolute value of RMPT.
*** The difference transverse deviation of returns.

The study of the model with constant in the first case studied in a daily context suggests that all variables set epigraphs; are $R_{m,t}$, $T_{m,t}$, MAD_t and $|R_{m,t}|$; are stationary in level because the calculated ADF statistics found for each of these series are higher in absolute value to the critical values for all corresponding levels of 1%, 5% and 10%. While on individual stock returns examined and their turnover rate, we find that the stationarity test allows us to assume that these two variables are considered stationary for all securities except TUNISAIR UIB and action: volatility of turnover of these actions remains responsible for the non-stationary detected.

Table 3: ADF test of Stationarity (Weekly Frequency)

Variables	*Statistics Calculated ADF*	*Critical Statistics*		
		1%	5%	10%
TMP_t	-2,618645	-3,19256	-2,96321	-2,6077
ΔTMP_t	-6,52176	-3,19256	-2,96322	-2,6077

***TPMT before differentiation. ** TPMT after differentiation of order 1.**

With a weekly frequency, the data remain stationary for the studied variables $R_{m,t}$, MAD_t and $|R_{m,t}|$ while this is not the case for the market rate weighted $T_{m,t}$ by reference to the calculated statistic that represents a value of approximately -2.618645 > critical statistics with different level of significance. It is therefore appropriate to apply the first difference in this last series to make it stationary, the technique carried out in this framework assumes a stationary series as is shown in the attached table.

Table 4: ADF test of Stationarity (Monthly Frequency)

Variables	*Statistics Calculated ADF*	*Critical Statistics*		
		1%	*5%*	*10%*
TMP_t	-1,923658	-3,6952	-2,9101	-2,5949
ΔTMP_t	-6,98624	-3,7012	-2,9296	-2,5951
MAD_t	-0,433695	-3,6952	-2,9101	-2,5949
ΔMAD_t	-4,862591	-3,7012	-2,9296	-2,5951
$VABS$	-1,659848	-2,6215	-1,9624	-1,7923
$\Delta VABS$	-6,896243	-3,7012	-2,9296	-2,5951

In the study of monthly data ultimately we believe $R_{m,t}$ the still stationary series level while for the other series $T_{m,t}$, MAD_t and $|R_{m,t}|$, we notice that they are non-stationary for all calculated statistics are higher than the statistics tabulated. By studying the following series in first difference logarithmic, we recognize their stationarity. Once all series used in this empirical investigation are stationary, we will look at the following second step of our methodology applied to test Granger causality to test the relationship that may exist between the volume trading and stock returns in order to highlight the psychological bias of over-confidence as a factor explaining the enigma of excessive volatility on Tunisian stock market.

4.2 Application of the Causality Test

In the light of the implementation of the causality test in the context of observations, daily and weekly and monthly, we postulate the following results:

Table 5: Test de Causalité au sens de Granger [Fréquence journalière, hebdomadaire et mensuelle].

Daily Frequency			
H_0 : TMP_t does not cause Granger RMP_t		H_0 : RMP_t does not cause Granger TMP_t	
F-Statistique	Probability	F-Statistique	Probability
0,07145	0,93962	5,901663	0,00291
Weekly Frequency			
0,07878	0,93998	2,36519	0,10423
Monthly Frequency			
0,43031	0,74269	0,08705	0,93682

RMP_t **: Weighted market returns.**

TMP_t **: Rate weighted market turnover.**

a. Daily Study Period :

To test the relationship between trading volume and stock returns depending on the model equations [1] and [2] to highlight the bias of over-confidence, we use the test of Granger causality while interested in the probability of occurrence associated with the studied parameters which will allow us to check if the bias of overconfidence detected among stakeholders on the Tunisian financial market explains the dynamics of realized volatility on the stock market and therefore check the efficiency of the market in question.

Based on daily observations, the object of the first case considered our causality test, we accept the null hypothesis that the rate of rotation does not cause Granger performance because the probability of associated with this first hypothesis remains insignificant with a value of about 0.93962, a probability that tends to 1. Secondly, we can assume that the causal relationship between the yield to the rate of rotation is checked referring to the probability associated with the base case with a value considered low; is a probability Pb = 0.00291. Hence it is a unidirectional causal relationship between the two variables studied: either return to the rotation rate and not vice versa. This first empirical validation allows us to conclude that overconfidence remains responsible for the realized volatility for daily frequency.

b. Weekly Study Period:

The application of the causality test for a period of weekly study allows us to recognize the same recommendations given for the observations with a daily frequency. In fact, we note that the probability that the null hypothesis is of the order of 0.93998 which requires us to accept the assumption that the rate of rotation does not cause performance. While on the other hand, we assume that the causal return to the rotation rate is significant with a probability of about 0.10423. Therefore; once again; we find the results in favor of the hypothesis of excess similar confidence in previous case.

c. Monthly Study Period :

For monthly observations, the test of Granger causality provides an empirical result contradict those developed for periods of daily and weekly studies. Indeed, the probabilities of the two tests are still considered non-significant with values of 0.74269 and 0.93682 and therefore, we can deduce that no causal relationship cannot take place between the rate of rotation of one hand and the dividend yield on the other hand.

Comparing the probability associated with the null hypothesis that the return does not cause Granger turnover is a clear progression in terms of the study period. In fact, the probability increases to 0.00291, 0.10423 then to reach the end of 0.93682 accounts, a value close to unity for a monthly frequency. Hence, the application of causality test allows us to conclude that the bias hypothesis of over-confidence can be validated and retained only for short periods (daily and weekly) then it is rejected according to the elongation of the study period (monthly).

1) VAR modeling market:

Before making use of estimates VAR models, we will choose premium aboard the optimal number of delays to be chosen according to both AIC and SC criteria. Under the VAR model defined, the number of delays to be used is of the order of 1, but in order to further refine the results, it is wise to compare different delays; our empirical investigation is based on 2 delays. We summarize the different results from the estimation of the VAR market in the Table 6: Estimated VAR market (daily frequencies, weekly and monthly).

a. For daily observations :

In light of the VAR model estimates the market [Table 6], we note TMP_t that the relationship between the current market turnover and noted the performance of delayed market remains significantly positive that the coefficient of the parameter RMP_{t-1} accepts a calculated statistic the order of 3.11 is well above the critical statistic is equal to 1.96. The first observation allows us to assume that the volume of transactions is explained by delayed at 1 while distinguishing the two variables studied are proportional because the mass of transactions recorded a higher volume in terms of a return performance higher market where we can confirm the existence of a significant relationship between the volume of transactions on the one hand and the market return on the other hand it remains in favor of the hypothesis which states that the overconfidence explains the volume of transactions via the self-attribution bias.

Also, by focusing on the relationship between the rate of rotation with those delayed current of order 1 and 2, we derive significantly positive coefficients with statistics calculated, respectively, 4.37589 and 7.65294, vastly superior the critical statistic (1.96). And therefore we can assume a second strong positive autocorrelation between trading volume and turnover are delayed TMP_{t-1} and TMP_{t-2} .

Turning to the relationship between turnover RMP_t and delayed levels 1 and 2, we can infer the absence of a significant relationship between these variables as calculated by comparing the statistics with those tabulated, we find that Statistics-t [TMP_{t-1}] = 1.14 <1.96 and also TMP_{t-2} with a t-statistics about 1.19 <1.96. So we can apply at this stage

only the performance explains the volume of transactions that is in contradiction with the work developed by Statman, Thorley & Vorkink [2004]. We emphasize at this point that current research relationship between the turnover rate and the standard deviation of returns transverse MAD_t designated is deemed significantly positive for the Student statistic associated with this variable is of the order of 2.21> 1.96 while this relationship is violated for time volatility of returns that t-statistics <t-Review. Previous work; such as those of Statman, Thorley & Vorkink [2004]; attributes this to the impact of market information. Adjusted element R^2 (Adj R-Squared) allows us to note that only 26.65% of the variables introduced in the model are able to explain market performance while only 5.61% of the variables explain the dynamics of turnover market, which was translated by a high significance of the constant C, or t-statistics = 16.016 >>> 1.96. Hence, we can conclude that there are other variables involved in explaining the volume of transactions. As part of this research, the main interest is to emphasize the role given to overconfidence in explaining the volume of transactions: which will be developed later via a second version VAR on each title but before i take this model econometric technique, it would be wise to consider the VAR market with weekly data.

b. For weekly observations :

The application of the VAR model on weekly data [Table 7] provides us with different results compared to those distinguished in the study with a daily frequency. Indeed, the coefficients associated with the relationship between the current turnover rate and the delayed returns remain insignificant statistically because all t-statistics of the first two delays are of the order; respectively; of -1.11 and -1.777, which are strictly less than the critical statistic. Such a result for weekly data suggests the absence of a significant relationship between overconfidence and trading volume and therefore a violation of the basic assumption.

We also generalize this finding to the relationship between the rate of flow rotation and those who delayed checks of the same non-significance between the parameters tested. This result implies that the rate of rotation is judged unable to explain the observed level of performance for a weekly time horizon. These extrapolated results remain inconsistent with the hypothesis of overconfidence postulated but they support the hypothesis of market efficiency that allows us to say that overconfidence, cognitive bias is detected for periods of short-term (daily time horizon) which is harmonized with the recommendations of Statman, Thorley & Vorkink [2001].

c. For monthly observations

Under the VAR model of the market; with a monthly frequency; we check the results in a weekly context [Table 8]. All coefficients of our model implemented are insignificant and also values, we affirm that the horizon over which the model is applied is long, the VAR market is insignificant. In other words, the relationship between trading volume and values of returns is not verified or detected in the short term.

This empirical result can be explained by the fact that the achievement of a positive market return delayed by one order can be treated by investors on the financial market as a sequence of their strong ability to choose the best alternative to investment and the accuracy of their own private which will generate an excessive sense of trust that will be translated by a massive exchange to explain the high volume of transactions in the short term information. While later, the various players in the financial market in question will react in a different way while trying to correct their interpretations and expectations to their investments through other factors (such as learning, for example) that which explains the absence of overconfidence in the long term and then return to the theory of efficient financial market as investors generally react very quickly without any time to bother to anticipate the consequences their financial decisions in the short term while it is not the case for long periods (to be a weekly or monthly frequency) where they behave objectively in front of all investment opportunities while taking the right decision without present overconfidence.

2) The functions of the impulse responses associated with the VAR market:

Premium on board, we use the results illustrated the VAR market for a daily frequency in order to elucidate the dynamics of the relationship between market returns and trading volume. In addition, the graphs showing the functions of impulse responses are distinguished convergence of all variables in our VAR model to their equilibrium level zero, which verifies the stationarity of the model studied. The importance given to this econometric technique is summed up in the fact that such functions allows us to develop better results previously postulated by referring to all the coefficient estimates VAR to detect and illustrate the full impact of shock residue. Of such a shock on the residual influence $e_{R_{m,t}}$ current and future employee turnover and market performance which allows us to test the overconfidence hypothesis values. While a shock to have an impact $e_{V_{m,t}}$ on current and future values of two parameters highlighted.

Responses turnover market vis-à-vis an impact on residues $e_{R_{m,t}}$ and $e_{V_{m,t}}$ residues are represented; respectively; by Figure 1 [Functions impulse responses associated with the VAR market (daily frequency) A] and Figure 1 [Features answers to the associated VAR market (daily frequency) pulses B] where the y-axis measures the degree of the positive rate of change in the relative rotational rate of rotation which is not affected by a shock. In fact, during the first period, the graph (1-B) identifies a positive impact on the rate of rotation of the market generates a response increase of about 0.0008 is equal with a standard type 1.2 E-05 at the rate of rotation of the days that follow, we can see a significant autocorrelation of market turnover during the first four periods.

Secondly, Figure (1-A) is to explain the impact of a shock on the market performance. Indeed, an examination of this graph illustrates a positive and persistent response of turnover due to a shock on the market return which confirms the results developed in the VAR model posit that market

returns have an impact significant on through overconfidence among investors and thereafter the activity of higher transactions. This conclusion is in harmony with the advanced pat Statman, Thorley & Vorkink [2004] in their empirical validation. Also, the two graphs can tell us that the response rate of rotation is more pronounced for a shock on the turnover as a shock to the market return. On the yield response respond to a shock on the yield and the rate of rotation; [Graphics (1-C) and (1-D)]; we see via the chart (1-D) that such shock on the turnover during the first period recorded a zero yield response which reflects a stable yields in the following days and thereafter, we can confirm the causal relationship to yield turnover (consistent with the recommendations generated after studying the market VAR) that is in harmony with the hypothesis of overconfidence in the first period. While the graph (1-C) shows a positive autocorrelation of market returns relationship, such a positive impact on yields will generate a positive response from market return in later days.

In conclusion, we can assume that for a short period resulted in a daily frequency to validate the hypothesis of overconfidence empirically through estimating the VAR market in the first place and then verified by the technical functions associated impulse responses according to the results found in the VAR market with a weekly and monthly Chart 2 [functions impulse responses associated with the VAR market (frequency Weekly monthly you]: the functions of the impulse responses are related to better clarify the deductions exploited. the study of the VAR market model has allowed us to verify the existence of excess bias of confidence among investors in the Tunisian daily observations in the context of operation of the puzzle excessive volatility observed even with a relatively low level of significance (value adjusted). View the shortfall and gaps identified for the first VAR modeling, we use the following version on each individual stock VAR model to better refine the interpretations and results used in other stages of research.

3) VAR Individual Titles:

In order to conduct this second version of the VAR model of individual securities, we use a sample of 35 Tunisian stock companies listed on the Tunisian stock market BVMT while representing the general index of trading activity in the TUNINDEX Tunisian context. Our objective in the context of this empirical investigation is to elucidate the excess through trust as a transaction engine through a VAR model on each of the 35 stocks studied. The estimated VAR model of individual securities tri-variant that corresponds to the equation [5] is a clear range of detection results against the bias of over-confidence in the context of the Tunisian financial activity. We notice that certain actions suffer from this behavioral bias as the main explanatory cognitive through its transaction volume while other shares remain in alignment with the assumption of efficient financial markets as they lack of bias. Specifically, only four actions among all the shares in our sample belonging to the Tunisian stock index TUNINDEX have overconfidence; are: Amen Bank (AB) Bank Habitat (BH), General Lease (GL) and Tunisie Leasing (TL).

In light of the results shown in Table [9], we distinguish a coefficient corresponding to the RMP_t first delay parameter is statistically significant with a statistical value calculated in the range of 1.98661 which is strictly greater than the tabulated critical statistic (1.96) and therefore, we can judge the relationship between the market return and individual turnover rate of that share is significantly positive even in the case where the delayed returns are introduced into the model: what remains favor with the basic assumption of overconfidence. Statistics calculated for the other attached to the coefficient $R_{i,t}$; with two corresponding delays; we distinguish values that are less than 1.96 which implies the absence of a significant relationship between the performance of Amen Bank action and the rate of rotation. So we come to the conclusion; via the results achieved; the rate of rotation of the considered action is fully explained by the market return and then we can accept the hypothesis of overconfidence. Adjusted R^2 who can tell us about the very low explanatory power house with $T_{i,t}$ a value 0.040250 which indicates that only 4% of the variables in the model are able to explain the retention rate of rotation of Amen Bank (AB) Action .

It is noteworthy that we found the same recommendations for Habitat Bank shares (BH) and Tunisie Leasing (TL). In fact, these three actions have good and nice confirmed the basic assumption of overconfidence and empirical evidence developed with the first version of the VAR model where market through over-confidence is detected and more pronounced in the short term (daily study period) and long term (periods of weekly and monthly studies). Although our general problem of this paper is to elucidate through overconfidence and its contribution in explaining the erratic price movements of financial assets, but it remains important to note that several other actions in our sample blow to another cognitive bias is equally important that the bias studied in behavioral finance; or the disposition effect; resulting in a critical dependency between current transactions being delayed and yields which implies that the volume is mainly explained by the disposition effect: are the following: Al Mazraa, ATL, STB, CTL, General Store, SIMPAR, SOTETEL, SPDIT-SICAFs. Moreover, the results of applying the VAR model to ATL Action proves the existence of a relationship between a statically share the current rate of transactions of action highlighted and yields delayed order 1 on the other hand with a calculated statistic of about 2.84394; is strictly greater than the critical statistic (1.96). Hence, we can deduce that the contribution of delayed returns of ATL major action is in the explanation of its turnover while avoiding the variable market return. For the rest of the acts studied, we note that they do not suffer the impact of cognitive biases discussed, that is to say, transaction volumes remain off the excess effect of trust and disposition effect this allows us to test the hypothesis of efficiency for these actions.

4) The functions of the responses associated with the VAR impulse individual titles

Always take the case of Amen Bank share (AB) affected by the biais excess of confidence, we distinguish the functions of impulse responses associated with the second version of

VAR developed [Figure 3: Functions of impulse responses associated with the VAR individual titles]. According to the graphs G, H and I, we note that the functions of impulse responses associated with the VAR model that share portends reactions turnover action Amen Bank impact on the performance of the action itself on the market return $R_{i,t}$ and finally the individual turnover. While explaining the various graphs that allow us to measure the impact of such a shock on the parameter of interest, we note a significant response rate of rotation of Amen Bank following a shock effect on individual performance while our record a significantly positive response statistically rotation rate $T_{i,t}$ after the simulation of a positive shock to the market return with a magnitude of about 1.87 E-05 (either with a gap equal type 8 0 E-06) during the first period while noting the persistence of the phenomenon observed during the following three periods. The extrapolated results in light of the implementation of the technical functions of the impulse responses are recommended to confirm the application of VAR model that remain in favor of the hypothesis of overconfidence for the action to highlighted.

On the other hand, we see a positive impact on the variable $T_{i,t}$ results in a significant and positive response on the rate of rotation while recording for the first time a value of 0.000359 (standard deviation of 5.6 E-06) and is persistent during periods four following which confirms the advantage of auto-correlation of turnover of individual securities. With regard to these results, we can assume that the rate of rotation of Amen Bank (AB) action is explained by the market return and turnover delayed and therefore we can conclude that the excess confidence remains responsible for the volume of transactions, not the disposition effect. We try via graphs A, B and C to detect the responses of individual performance of Amen Bank actions impact on the performance of this action, the market return and its turnover. While the three graphs D, E and F are considering functions of impulse responses associated with market returns following a shock on the individual performance of the work under review, the performance of the market and individual turnover. We observe in the light of these positive responses graphics variable RMP_t to shocks on the performance and individual performance while a shock on individual turnover generates a null response $T_{i,t}$. However, these results again show an autocorrelation on the one hand between the market yields and secondly, two interdependent categories of performance; that is to say, the market return and individual performance. We attribute this kind of result in the selection of the sample used in the empirical investigation which is limited to 35 companies listed on the Tunisian stock market: we can generalize these results to the Habitat Bank shares (BH), General Lease (GL) and Tunisie Leasing (TL) which predict the existence of overconfidence.
If we take other actions that are not characterized by overconfidence, $T_{i,t}$ such action ATL, the latter of which is characterized by the disposition effect, we note that the response of the parameter remains negligible due to a shock performance in front of the RMT market face a shock on individual performance $R_{i,t}$: this is why we can postulate that only the individual performance comes in explaining the volume of transactions rather than the market return. This result confirms that in the case of ATL action is the disposition effect remains able to explain the excess volatility puzzle, not overconfidence. It should be noted that following a significant positive response after a positive shock $T_{i,t}$ on the same variable, we observe a positive autocorrelation of individual rates of rotation.

5. Conclusion

The fundamental problem posed at the beginning of this research was attached to an attempt to explain the puzzle of excessive volatility as a behavioral perspective. The over-confidence of investors has been suggested as the predominant explanation for this financial phenomenon that they distinguish between market growth and recession and when they reap gains from capital gains, their belief in their abilities amplified by through the self-attribution bias leads them to negotiate too securities markets. Our objective in the context of our empirical investigation was to examine the relationship between the component of the exchange activity over-confident investors and market volatility by considering a sample of 35 Tunisian firms listed for the period January 2000 and December 2010 for three cases of frequencies: daily, weekly and monthly.

The exploitation of the results achieved by all the tests conducted illustrates quite clearly the motivation to consider this bias in the context of the analysis specified the Tunisian stock market. Indeed, the study of causal relationships Granger has allowed us to postulate a first empirical validation that it is the performance that explains the volume of transactions. However, the excessive volatility remains well in part a consequence of the exchange activity Stakeholder-confident while checking an asymmetric nature of volatility dynamics in terms of response to positive and negative shocks. Once through overconfidence is detected on the Tunisian financial market; we made use of an early version of bivariant VAR model on the market as a whole in order to elucidate the nature of this bias and the volume of transactions and that has allowed us to show that overconfidence has a positive influence the volume of transactions and it is only for a period of daily study. To better refine advantage of previously developed results, we studied a second version of the VAR model on individual securities while connecting three endogenous variables (individual turnover on each action i, the dividend yield and i the market return) with a single exogenous variable (the temporal volatility of returns) .Some actions of the sample studied were beautiful and well confirmed the basic assumption through a significantly positive relationship between the rate of rotation course of action under consideration and yields delayed while other shares remain off effect of excess through confidence they suffer from the disposition effect verified by another significant positive relationship between the individual and his turnover rate yield. One aspect has been raised very interested in the light of our study is that investors are guided by their psychological leave short-term more than they are long term implying that Tunisian investors react quickly to new information to correct their expectations for a long period,

which explains the absence of the excess through confidence for longer time horizons.

Annexes:

***Measurement of variables:**
To test predefined hypotheses, we are invited to identify two endogenous variables and two exogenous. Therefore; examining the relationship between overconfidence and trading volume requires the establishment of two measures that are endogenous variables are yield and volume of transactions. In other words, exogenous or control variables will be presented by the cross-market average deviation and the absolute value of market returns.

a) Measurement of endogenous variables:
The exchange activity in the financial markets has been widely discussed and defined; we distinguish two main measures attached to this parameter: the trade volume and turnover. Therefore, the first step is quantified by the number of shares traded for each share listed on the stock exchange while considering generally the number of shares traded as a proxy for the exchange activity: it is why this index is considered a measure of liquidity for different actors and stakeholders in the financial market. On turnover (turnover), the financial literature offers this variable as being the most appropriate measure to the economic reality of transactions that the first measure implementation varies from one year to another for most institutions financial traditionally due to variation of the shared capital.

Because of the above reasons, some researchers have used as part of their research turnover as a measure relative, not absolute, the exchange Lo & Chang [2000] Statman & Vorkink activity [2004] and Chung & Lee [2006]. We define the rate of rotation of an action i as follows:

$$T_i = \frac{\text{number of shares traded for stock i}}{\text{number of outstanding shares of stock i}} \quad \text{(i)}$$

While the rate of rotation of the market is calculated using two techniques, namely:

- Weighted rate of rotation of the market (noted TMP_t) :

$$TMP_t = \frac{\sum \text{number of shares traded in rate} * \text{current stock i in t}}{\text{market capitalization}} \quad \text{(ii)}$$

Otherwise $TMP_t = \sum_{i=1}^{I} W_{i;t} T_{i;t}$.

Which $W_{i;t}$ is defined by the market capitalization of stock i at time t Devisee by market capitalization in t by measuring the market capitalization using the following formula:

CB_t = (Number of outstanding shares of stock i at time t) * (current stock i in t).

As part of our research, we plan to determine the rate of rotation by the first method because our sample of 35 companies listed on the Tunisian stock market does not reflect the totality of the general activity index TUNINDEX Tunisian market. Indeed, the calculation of TMP_t helps us find the results; priori; real and not biased because TUNINDEX consists of over 35 companies. So to calculate returns, we are asked to specify the returns of individual securities and market (or index TUNINDEX on the companies in our sample).

Moreover, it will be helpful to use weighted market returns (noted RMP_t) calculated using a similar method to the determination of the US S & P 500 (Standard & Poor's composite 500). This parameter is defined as the contribution of each financial asset in the portfolio returns on the market with a determined by the ratio of market capitalization to total market capitalization ratio; are:

$$RMP_t = \frac{\sum_{i=1}^{N} CB_{i;t} \times R_{i;t}}{CBT_t} \quad (iii)$$

With

$$RMP_t = \frac{CB_1}{CBT} R_1 + \frac{CB_2}{CBT} R_2 + \ldots\ldots\ldots + \frac{CB_n}{CBT} R_n .$$

And CB_{it} : Number of shares multiplied by the price of the i in period t. Is the market capitalization of stock i in period t.

CBT_{it} : The total market capitalization during the period t.

We note that these two indicators are involved in their composition all financial assets available on the BVMT

R_{it} : Return of security i in period t.

n: number of shares to be studied (35 companies for our empirical study).

b) Measurement of exogenous variables:
Exogenous variables to be taken into account in our empirical investigation are respectively the average deviation of the market cross and the absolute value of the market $\left|R_{m;t}\right|$; we define:

$$MAD_t = \sum_{i=1}^{N} W_{it} \left|R_{it} - R_t\right| \quad (iv)$$

$$W_{it} = \frac{\text{Market capitalization of stock i}}{\text{Market capitalization}} \quad \text{(v)}$$

With R_{it} : Return of security i in period t.

N: total number of shares in the sample

P: number of lags which has been selected using AIC and SC.

Consideration of control variables and is to review $\left|R_{m;t}\right|$ and MAD_t discuss the various empirical results of the current relationship between judged positive trading volume and volatility puzzle efficiency values for optical variety of theoretical perspectives: it is for this reason that it is useful to express the market returns in absolute terms to control this contemporary relationship (Karpoff added the absolute performance at time t in order to control the contemporaneous relationship between trading volume and volatility of returns.)

Referring to the intuition of Ross [1989] which postulates that friction in a market characterized by an absence of

arbitrage opportunities, the information flow rate will be increased by the degree of volatility in the prices of financial assets. Subsequent works such as those of Bessembinder & al [1996] have used the absolute value of returns at time t to identify the reflex of the common information flow while MAD_t for specific information to firms in order to account informational investors. Also, the empirical study of Chuang and Lee [2006] confirms more R_{mt} and MAD_t use as control variables to test and evaluate the causal relationship between Granger transaction volumes and values returns.

Table 1: List of titles studied (Case of Tunisia)

Banks	*Ser General Store vices*	*Industry*
Amen Bank (AB)	Magasin Général	Air Liquide Tunisia
Arab Tunisian Bank (ATB)	MONOPRIX	Al Mazraa
Arab Tunisian lease (ATL)	Pal Beach	ALKIMIA
ASTREE Company Insurance and Reinsurance	SIMPAR	IFC**
Bank of Tunisia (BT)	TUNISAIR	SIAME
Bank of Tunisia and the UAE Investment (BTEI)	SOTETEL	SFBT***
Attijari Bank	SOTUMAG*	SOTUVER
Bank Habitat (BH)		Tunisia Milk
Internationale Arab Bank of Tunisia (BIAT)		
National Agricultural Bank (BNA)		
Cie Internationale of Leasing (CIE)		
Investment in TunisiaSICAF (PTS)		
Tunisian society bank (STB)		
SPDIT-SICAF		
STAR		
Tuninvest SICAR		
Tunisia Leasing (TL)		
Union Bank for Trade and Industry (UBCI)		
International Union of Bank (UIB)		
General Leasing (GL)		

*: Tunisian Company MAR GROS.
** : Chemical Industries fluorine
***: Cooling Company and brewery Tunis.

Table 6: Estimated VAR market model (Daily Frequency).

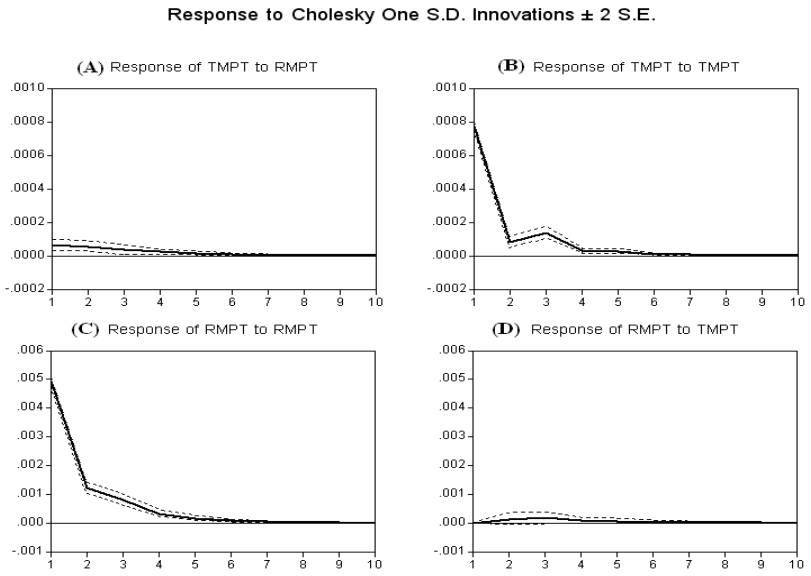
Estimated VAR market model (Daily Frequency).						
*Erreurs standards ( ) avec : ***1%, **5%, *10%* *t-statistiques [ ]*						
Endogenous variables	*RMPT*	*TMPT*		*Exogenous variables*	*TIT*	*RMPT*
RMPT (-1)	0,254326 (0,02072)*** [12,2744]	0,009860 (0,0322)*** [0,30621]		**C**	0,003190 (0,00021)*** [15,19047]	0,000292 (3,1 E-05)*** [9,41935]
RMPT (-2)	0,096922 (0,02011)*** [4,81959]	0,001601 (0,00313)*** [0,51151]		MADT	-0,450452 (0,03227)** [-13,9588]	0,011023 (0,00511)*** [2,15714]
TMPT (-1)	0,169051 (0,14121)* [1,19716]	0,103651 (0,02267)** [4,57216]		VABS	0,187156 (0,05013)** [3,73341]	-0,0086 (0,00765)*** [-1,12418]
TMPT (-2)	0,174952 (0,14785)* [1,18330]	0,155989 (0,02213)** [7,04875]		R^2	0,267839	0,056018
				R^2 ajusté	0,265674	0,053226
				F- statistique	123,7081	20,06753

Table 7: Estimated VAR market model (Weekly Frequency).

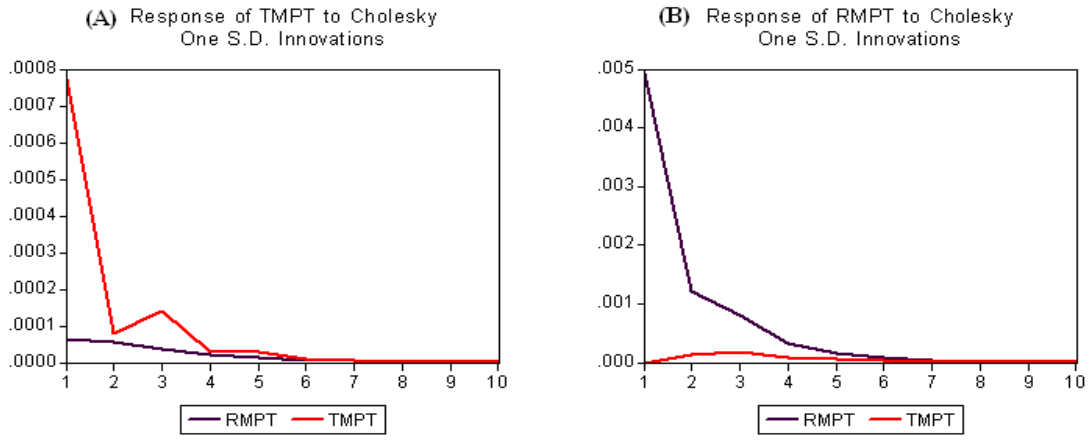
Estimated VAR market model (weekly Frequency).						
*Erreurs standards ( ) avec : ***1%, **5%, *10% t-statistiques [ ]*						
Endogenous variables	*RMPT*	*TMPT*		*Exogenous variables*	*TIT*	*RMPT*
RMPT (-1)	0,124449 (0,04532)** [2,746006]	-0,439233 (0,41023)* [-1,07069]		**C**	0,007661 (0,00136)*** [5,63308]	-0,006201 (0,01265)*** [-0,49019]
RMPT (-2)	0,061908 (0,04692)** [1,31943]	-0,726658 (0,41109)* [1,76763]		**MADT**	-0,697512 (0,07481)* [-9,32378]	-0,005562 (0,69982)* [-0,007947]
TMPT (-1)	-0,003220 (0,00653)*** [0,493108]	-0,521392 (0,044916)** [-11,60815]		**VAB S**	0,671364 (0,09896)* [6,784195]	0,501102 (0,87202)* [0,57464]
TMPT (-2)	5,3 E-05 (0,00652)*** [0,00812]	-0,243371 (0,04871)** [4,99632]		**R^2**	0,169366	0,232161
				R^2 ajusté	0,156844	0,220585
				F- statistique	13,52538	20,05627

Table 8: Estimated VAR market model (Monthly Frequency).

Estimated VAR market model (monthly frequency)						
*Erreurs standards ( ) avec : ***1%, **5%, *10% t-statistiques [ ]*						
Endogenous variables	*RMPT*	*TMPT*		*Exogenous variables*	*TIT*	*RMPT*
RMPT (-1)	0,096411 (0,12176)* [0,791811]	0,347931 (1,54367)* [0,22539]		**C**	-0,000152 (0,00411)*** [-0,036982]	-0,0073111 (0,05569)** [0,131282]
RMPT (-2)	0,068015 (0,11160)* [0,609453]	-0,491259 (1,386925)* [-0,354207]		**MADT**	-0,005869 (0,00512)*** [1,14628]	0,055976 (0,07031)* [0,796131]
TMPT (-1)	0,001411 (0,00801)*** [0,176154]	-0,586691 (0,11962)* [-4,90462]		**VAB S**	0,000602 (0,00232)*** [0,259482]	-0,017311 (0,03201)** [0,540799]
TMPT (-2)	-0,003594 (0,00872)*** [-0,412155]	-0,473869 (0,14545)* [-3,25795]		R^2	0,035539	0,298629
				R^2 ajusté	-0,033351	0,248531
				F- statistique	0,155880	5,960910



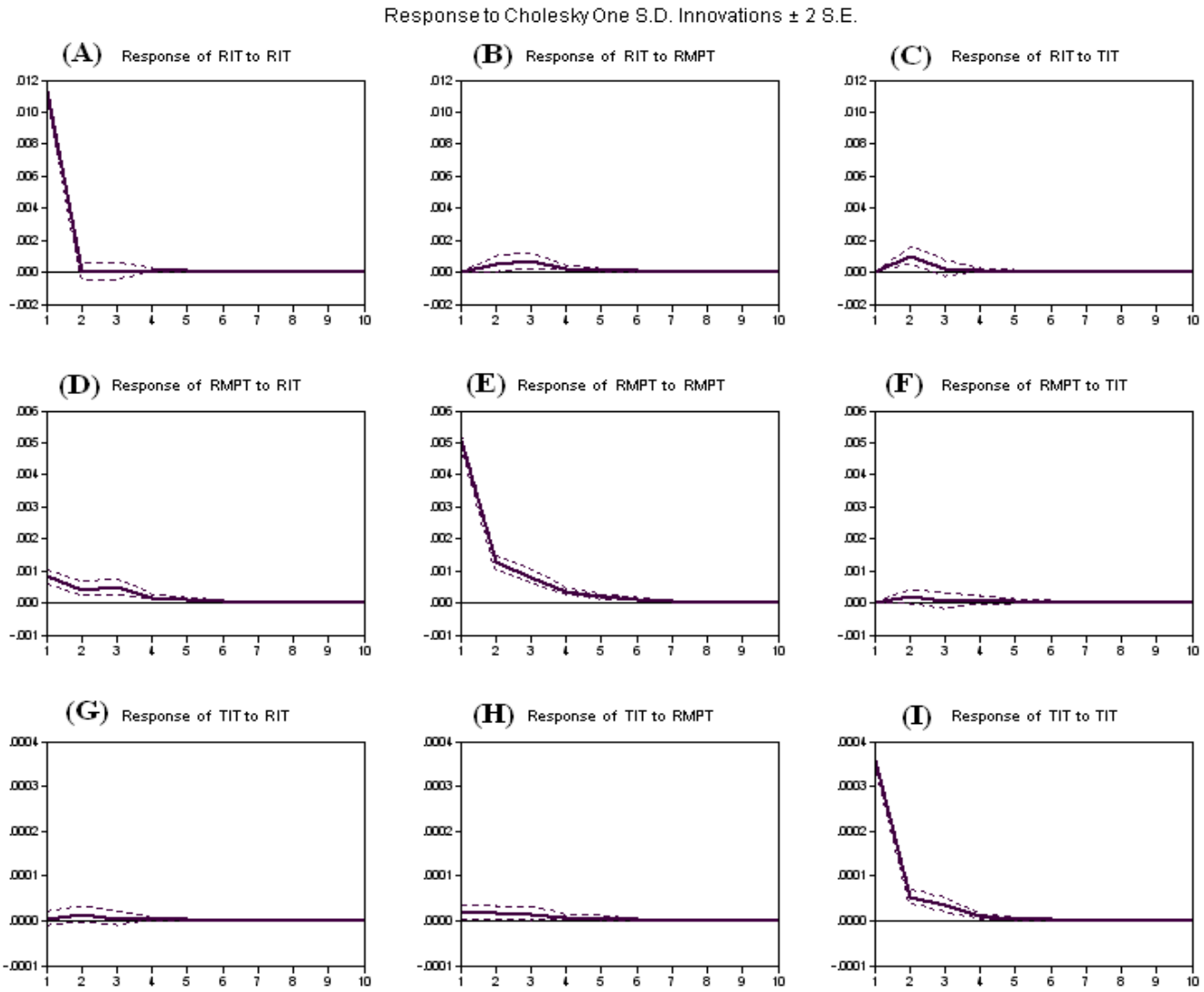
Graphic 1: Functions impulse responses associated with VAR market (daily frequency).



Graphic 2: Functions impulse responses associated with VAR market (weekly and monthly frequencies).

Table 9: Estimated VAR model (Daily Frequency) Amen Banque.

Estimated VAR model (Daily Frequency) Amen Banque.								
*Erreurs standards ( ) avec : ***1%, **5%, *10% t-statistiques [ ]*								
Endogenous variables	*TIT*	*RIT*	*RMPT*		*Exogenous variables*	*TIT*	*RIT*	*RMPT*
TIT (-1)	0,150123	2,901,284	0,501692			7.82 E-05	-0.000501	0.001627
	(0,02193)**	(0,69492)*	(0,33269)*		**C**	(1.02 E-05)***	(0.00034)***	(0.0002) ***
	[6,845554]	[4,174989]	[1,507986]			[7,666667]	[-1,47353]	[8,135]
TIT (-2)	0,070239	0,042392	-0,092365			0.004378	0.089621	-0.438757
	(0.02221)**	(0,69982)*	(0,332691)*		**VABS**	(0.00176)***	(0.05563)**	(0.02641)**
	[3,162494]	[0,060575]	[-0.277629]			[2,4875]	[1,611019]	[-16,613290]
RIT (-1)	0.000965	-0.004112	0.019601		**R2**	0.04025	0.016844	0.194816
	[1,340277]	[-0,182512]	[1,73153]		**R2 ajusté**	0.036937	0.013451	0.192037
RIT (-2)	-3.92 E-05	-0.009641	0.029032		**F-statistique**	12.14995	4.963651	70.09714
	(0.00071)***							
	[0,055211]	[-0,042791]	[2,634482]					
RMPT (-1)	0.002923	0.091403	0.254432					
	(0.00154)***	(0.04692)**	(0.02129)**					
	[1,898051]	[1,948060]	[11,95077]					
RMPT (-2)	0.001431	0.01132	0.092465					
	(0.00148)***	(0.04632)**	(0.02099)**					
	[0,966891]	[0,244386]	[4,405192]					



Graphics 3: Functions of impulse responses associated with VAR individual titles

Table 10: Estimated VAR model (Daily Frequency) ATL.

Estimated VAR model (Daily Frequency) ATL.								
Erreurs standards ( ) avec : ***1%, **5%, *10% t-statistiques [ ]								
Endogenous variables	**TIT**	**RIT**	**RMPT**		**Exogenous variables**	**TIT**	**RIT**	**RMPT**
TIT (-1)	0.262031	0.166789	0.009496			0.000611	-0.000965	0.001742
	(0.0232)**	(0.0741)*	(0.0231)**		**C**	(0.0001)***	(0.0005)***	(0.0003)***
	[11,29443]	[2,25086]	[0 ,411082]			[6,11]	[-1,93]	[5,806667]
	0.169023	0.142525	0.033213			0.078201	-0.009126	-0.501296
TIT (-2)	(0.0232)**	(0.0741)*	(0.0231)**		**VABS**	(0.0261)**	(0.0833)*	(0.0258)**
	[7,28547]	[1,92341]	[1,437792]			[2,996206]	[-0,109555]	[-19,430077]
	0.000265	0.031565	0.006542		**R2**	0.13529	0.017454	0.211759
RIT (-1)	(0.0074)***	(0.0239)**	(0.0075)***					
	[0,03581]	[1,32071]	[0,872266]		**R2 ajusté**	0.132074	0.013799	0.208827
	-0.004612	0.011012	-0.005623					
RIT (-2)	(0.0076) ***	(0.0238)**	(0.0072)***					
	[-0,60684]	[0,46268]	[-0,780972]					
	0.041032	0.259623	0.221295					
RMPT (-1)	(0.0221)**	(0.0683)*	(0.0211)**		**F-statistique**	42.06465	4.775937	72.22762
	[1,85665]	[3,80121]	[10,487914]					
	0.050897	-0.027502	0.081143					
RMPT (-2)	(0.0209)**	(0.0685)*	(0.0212)**					
	[2,43526]	[-0,40148]	[3,8275]					

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