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The Impact of Investor Sentiment on The Tunisian Stock Market

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Abstract

Investor sentiment is a key concept in behavioral finance, it has attracted the interest of many researchers over the last decade. The present study develops a new measure of investor sentiment which includes indirect indicators. Our main objective is to test the impact of investor sentiment on returns on the Tunisian stock market. We construct the composite sentiment index using indirect indicators measuring sentiment (the performance index, the number of IPO, the average profitability of the first days of the firms newly introduced, the volatility premium, the Premium Dividend and finally the turnover rate) and based on the analysis of the principal component. Using a VAR model, we record a strong negative relationship between investor sentiment and future returnsaccording to the test results of the Granger causality and impulse response function. In addition, we find that of all past actions with different characteristics are not factors that explain the sentiment indicator.

Key Words: *Investor Sentiment, Stock Return, Market Timing, Var Model.*

Introduction

Hirshleifer (2001), The central task of the active financial is to determine how the expected returns are associated with both the risk and misvaluation investors. The last decade has witnessed a lively debate around the issue of the link between behavioral aspects of investors and financial markets. The investor sentiment is a key concept in behavioral finance, many studies have tried to model the role of investor sentiment in the financial markets (Black (1986), De Long, Shleifer, Summers etWaldman (1990), Daniel, Hirshleifer and Brennan, M., T. Chordia, and A. Subrahmanyam and Barberis(1998), Shleifer and Vishny (1998)), Kaplanski and Levy (2009), Baker, Wergler and Yuan (2011), Dergiades (2012). Overall, the models assume the existence of two types of investors and arbitrageurs noise makers introduce an additional risk on the assets they trade.

Literature of behavioral finance suggests that sentiment affects business decisions. The influence of future expectations of investors can cause over-or under-valuation of stocks, and thus affect the valuation models. Empirical studies testing how the sentiment predicted future returns in the stock of the United States (Kothari and Shanken (1997), Shiller (1981, 2000); Bakeret Wurgler, (2000), and Brown and Cliff (2005) and estimate the effect of sentiment on small stock premium (Lee and others, (1991), Swaminathan (1996), Brown and Cliff (2004) and Lemmon and Portniaguina (2006). Another series of studies examining the possibility of a causal relationship between returns and investor sentiment, finding no effect on the feeling returns in the short term, Otoo (1999), Jansen and Nahuis (2003) Brown and Cliff (2004) and Wang and al (2007). Wang (2001) analyze the effect of sentiment in the futures market, Han (2008), and Lemmon and

Ni (2008) in the options market, Ahn, and al. (2002) in the currency market and Burghardt, and al. (2008) and Schmitz and al. (2009) in the market guarantees. Chui, and al. (2008) shows that the cultural differences between countries can be an element of bias behavior. Pursue this problem, a number of studies which analyzed a range of international markets has reported findings that indicate to analyze differences between countries. Schmeling (2009) found that the feeling has an effect on performance in 9 of the 18 countries analyzed. His results suggest a stronger effect in the countries affected by the behavior of the herd, investor overreaction and lowers market integrity (the quality of information and institutional development). Chang, and al. (2009a and b) in both paper emphasizes the greater intensity of the effect in countries with a higher level of collectivism and greater access to news media, in partial contradiction Schmeling (2009). It offers more than high quality legal environments and corporate governance intensify the effect of feeling. Baker and al. (2009) analyzes several aspects of sense (global and local), observing their impact on financial market returns. They also explore the effects on other exchanges countries, given that the effect of investor sentiment in the United States is contagious across markets. A main problem is the true measure of the variable of feeling. This varies from one study to another, with researchers who draw on many indicators including surveys of investor Otoo (1999), Jansen and Nahuis (2003), Brown and Cliff (2005), Lemmon and Portniaguina (2006) and Schmeling (2009), the mood of investors, Kamstra, and al (2003), retail shops investor, Barber and al (2006), Greenwood and Nagel (2006) and Kumar and Lee (2006), the flow of mutual fund, Brown and al (2003) Frazzini and Lamont (2008), dividend premium, Baker and Wurgler (2004a and b), the discount of closed bottom expect, Zweig (1973); Lee et al (1991), Swaminathan (1996) and Neal and Wheatley (1998), option volatility, Whaley (2000), the number of IPOs and the means yields first day of introduction scholarship Ritter (2003) and Ljungqvist and al (2006), the volume of transaction rotation or Sheinkman and Xiong (2003) and Baker and Stein (2004). The theory does not seem to have developed clear criteria for assessing the validity of a variable with respect to others or even to the distribution of a variable into its constituent parts, Chang and al. (2009a and b) and Baker and al (2009). Most work has focused on the performance of small cap stocks, because they are held primarily by individuals. (Lee, Shleifer and Thaler (1991), Neal and Wheatley (1998)). Other studies showing that investor sentiment affects both small cap stocks that the market as a whole (Lee Jang and Indro (2002), Brown and Cliff (2004)).Before going into more detail in the subject, it is necessary to define the notion of investor sentiment, investor sentiment may be defined as investor influenced by emotions, future returns and investment risks, Chang et al (2009), and posed the following questions:

- Is the investor sentiment affects only the small caps?
- Is there more stock fragile investor sentiment than others?
- Affects Does the stock prices of companies regardless of their characteristics?

Baker and Wurgler (2006) showed that investor sentiment affects the cross sectional stock. They conclude that some firms are more sensitive to investor sentiment than others. According to them, the sense-profitability relationship is a function of the costs of arbitration and the nature of business valuation. Our study is in the same line of work that Baker and Wurgler (2006), but is distinguished by three key points.

1 - We use sentiment indicators monthly instead of annual data, which refines our results.

2 - Unlike Baker and Wurgler (2006), investor sentiment is not considered a conditional variable, but rather as an explanatory variable for returns. This approach allows us to study the dynamic relationship between sentiment and returns.

3 -The list of characteristics of firms vulnerable to investor sentiment different from Baker and Wurgler(2006).

Our paper is organized as follows. In the next section, we present a brief summary of the previous literature. The second section is devoted to the presentation of data, variable construction and the methodology and analysis of results. Finally, we conclude with a summary of our main results.

Literature Review

Chang and al. (2009a) investor sentiment can be defined as investor sentiment, often influenced by emotions, future returns and investment risk. Baker and Wurgler (2006) also explained the propensity to speculate or optimism or pessimism of a given asset. Define the feeling is to identify an investor who is optimistic (pessimistic) without good (bad) economic reasons to be. The literature has used several different measures of investor sentiment, as described in the theoretical framework. Baker and Wurgler (2006) use the principal component analysis to construct an index that aggregates a collection of variables sentiment indicator: two major families of measures can be distinguished: direct measurements and indirect measurements.

Direct Measures: are produced using surveys of investors and economic studies. Solt and Statman (1988) tested the influence of the sentiment index from the Investors Intelligence survey of the Dow Jones over the periods 1963-1985 and they find that the feeling is not a reliable signal to effect transactions in scholarship. Indeed, there is no significant relationship between investor sentiment and Clark and Statman (1998) did the same test on the S & P500 over the periods 1963-1995 and confirms the result found by Solt and Statman (1988. Shiller (2000) tested a weak relationship between confidence indices of Yale University and several other proxies of investor sentiment.

De Bondt (1993) shows a significant negative relationship between sentiment index published by the American Association of Individual Investors (AAII) and future returns, what contradicts the results of previous studies. Brown and Cliff (2005) confirms in his article that examined the long-term correlation between the index of Investors Intelligence sentiment and profitability, the importance of investor sentiment in the valuation of financial assets. Otoo (1999) figured their study on consumer confidence indices and their relationship with the investor sentiment, and it is a significant relationship between simultaneous changes in the consumer confidence index from the University of Michigan and returns to Wilshire 5000 index over the period 1980-1999, the causality tests indicate that market movements affect investor sentiment.

Fisher and Statman (2003) concluded in his study the possibility to credibly predict the returns the indices of consumer confidence. . Indeed, there is a strong negative relationship between confidence indicators and returns of small cap stocks in the short term. This result is inconsistent with Otoo (1999), but confirms the behavioral approach, which provides that the sentiment of the individual investor claims primarily securities held by individuals, in this case small caps. Qiu and Welch (2005), Lemmon and Portniaguina (2006) and Charoenrook (2006) confirmed the results found by Fisher and Statman (2003). it should be noted that in each study, the measurement technique, there are both advantages and disadvantages.
Indeed direct indicators are specific measures that do not require sense to use theories to justify. But it does not take account of the strength and performance of the market. For this we will remake indirect indicators that provide a better reflection of the strength and performance of the market and relate to economic and financial variables.

The Indirect Indicators: The indirect method assumes that certain financial and economic variables contain expectations are not justified by the fundamental economic, such as the number of IPOs, the initial profitability of enterprises newly introduced, the discount on closed-end funds, the premium dividends, volatility premium, premium dividend ....
To measure investor sentiment, several empirical studies refer to indirect proxies.

The discount of closed-end funds by Shleifer and Thaler tested (1991), they show that the share of U.S. closed-end funds are traded at a discount relative to the value of their underlying portfolio and the discount affects the profitability of securities held primarily by individuals and they find that the discount decreases when the price of the securities of small caps and screws to increase it. By cons, Chen, Kan Miller (1993) and Elton, Gruber and Busse (1998) find that the discount on closed-end funds is not involved in the

reproductive process of returns. The existence of the large premiums and discounts fluctuations over time find no justification in the traditional approach. Several previous studies have shown that the discount is negatively related to investor sentiment (Zweig (1973) and Lee, Shleifer and Thaler (1991).

Volume of IPOs (NIPO) studied by Lee, Shleifer and Thaler (1991), Helwege and Liang (1996), Rajan and Servaes (1997) and Lowry (1999), Baker and Wurgler (2006), Cornelli, Goldreich and Ljungqvist (2006) showed that the volume of IPOs is positively associated with investor sentiment and IPOs are very sensitive to the mood of investors. Indeed, when investors are optimistic, they are more prepared to overpay titles newly introduced on the market and therefore, more companies will be encouraged to enter.

The volume of transactions can be considered as an indicator of investor sentiment. Baker and Stein (2004) notes that if the short sale is more expensive than opening and closing long positions (as in practice), the irrational investors are more inclined to negotiate, thus increasing liquidity when they are optimistic and invest in rising stocks rather than when they are pessimistic and threats declines in stocks.

- The volatility premium used by Baker and others (2009) to replace the dividend premium which is inappropriate in countries where dividends are rare, which is an indicator of investor demand compared between periods of high and low volatility.
- The rate of rotation, another category of indicators is linked to certain types of business activities. The turnover (TURN) was calculated as the ratio of the volume of transactions on the number of shares outstanding, it measures market liquidity and may serve as a measure of sentiment Baker and Stein, 2004). In a market of short sales, the irrational investors participate and increase liquidity in a market where investor sentiment is positive (Bris, Goetzmann, and Zhu (2007)).
- Cash flow net is proposed as a sentiment indicator in Frazzini and Lamont (2008) and Indro (2004). In times of high investor confidence, individual investors bought mutual funds (see, eg, Brown and Cli (2004)
- Firm's debt equity ratio, proposed by Baker and Wurgler (2000) to measure investor sentiment showed that managers try to time the market prefer to issue equity rather than debt when the sentiment is high, and vice versa

Although several studies based on surveys to measure investor sentiment, Brown and Cliff (2004), Brown and Cliff (2005), the use of surveys can also be problematic because of inaccurate responses, misunderstood questions, Bertrand and Mullainathan (2001), and non-response bias, Groves (2006). Therefore, documents such as Lee, Thaler and Shleifer (1991) and Dorn (2009) suggest using indirect indicators. Baker and Wurgler (2006) form a sentiment index based on the first principal component of a number of indirect proxies: ADV / DEC, ARMS, HILO, TURN, EQU, NIPO, RIPO P and D-ND

Results and Interpretation

The data were collected from the Tunis Stock Exchange BVMT. Orders are: accounting and finance.

The Crude Indicators of Sentiment

We construct a composite index of sentiment which includes indirect indicators. Six sentiment indicators involved in the construction of the composite index:
The premium volatility (PVOL), the premium of dividend (PDIV), the index performance (ARMS), The monthly number of firms newly introduced (NIPO), average monthly first day of trading companies newly introduced (RIPO) and and finally the trading volume or the turnover rate , it is presented as the ratio of number of shares traded number on of shares outstanding (TURN).

All data are monthly frequencies and cover the period from January, 2008 till December, 2012. The indicators of feeling are calculatetd as follows :

The first proxy(PVOL) is the log ratio of the equal-weighted average market-to-book ratios of stocks with high idiosyncratique volatility (top three deciles) and with low idiosyncratic volatility (bottom three deciles).

The second proxy PDIV (the priumin of dividend) : it is the difference between dividends received and the paid dividends. The third proxy ARMS (index performance) : the number of the titles which knew a progression of coutyards standardized by their volumes exchanges divided by the number of the titles which knew a decrease of the lectures standardized by the volumes of exchange of these titles.

The fourth proxy is NIPO : The monthly number of firms newly introduced
The fifth proxy is RIPO Profitability : average monthly first day of trading companies newly introduced
The sixth proxy is TURN : number of shares traded / number of shares outstanding

Construction of the Composite Index of Sentiment

Investor sentiment is not easy to measure, but there is no fundamental reason why we can not find that imperfect indicators remain useful over time. We apply a principal component analysis (PCA) on the Six sentiment indicators in order to isolate the common component.

The Principal Component Analysis: A set of methods to perform linear transformations of a large number of intercorrelated variables to obtain a relatively small number of uncorrelated components. This approach facilitates analysis by grouping the data into smaller sets and to eliminate the problems of multi-collinearity between variables. The principal component analysis is similar to factor analysis, but it is an independent technique that is often used as a first step in a factor analysis (Vogt, 1993, page 177). « Dictionary of statistics and methodology. " Stevens (1992) also puts into relief the interest offered by the principal component analysis as a technique for data reduction. The main objective of PCA is to summarize effectively as possible in a single indicator information retained in the common set of indicators. The advantage of the composite index is that it reflects the moral of a very large sample of investors, both those PVOL, PDIV, ARMS, NIPO, RIOP and TURN. As a result, the relation « lead lag " is taken into account in the construction of the composite index. We follow the same approach as Baker and Wurgler (2006) to avoid the problem of timing, because the indicators may reflect the same sentiment factor at different times.

Then we take the Six variables (current or offset each proxy) with the highest loadings with the first clue. Finally, we define our measure of sentiment as the first principal component based on the correlation matrix of selected variables. We obtain the following composite index:
ICS=0,879TURN-0.802PVOL+0,810PDIV+0,696NIPO+0,924ARMS+0.927RIPO (1)

PCA revealed two dimensions that explain round 80% of the total variance of the common factor. The first part summarizes the most significant change, she says her only round 25% of the variance. We record the coefficients of sentiment indicators have the expected signs.

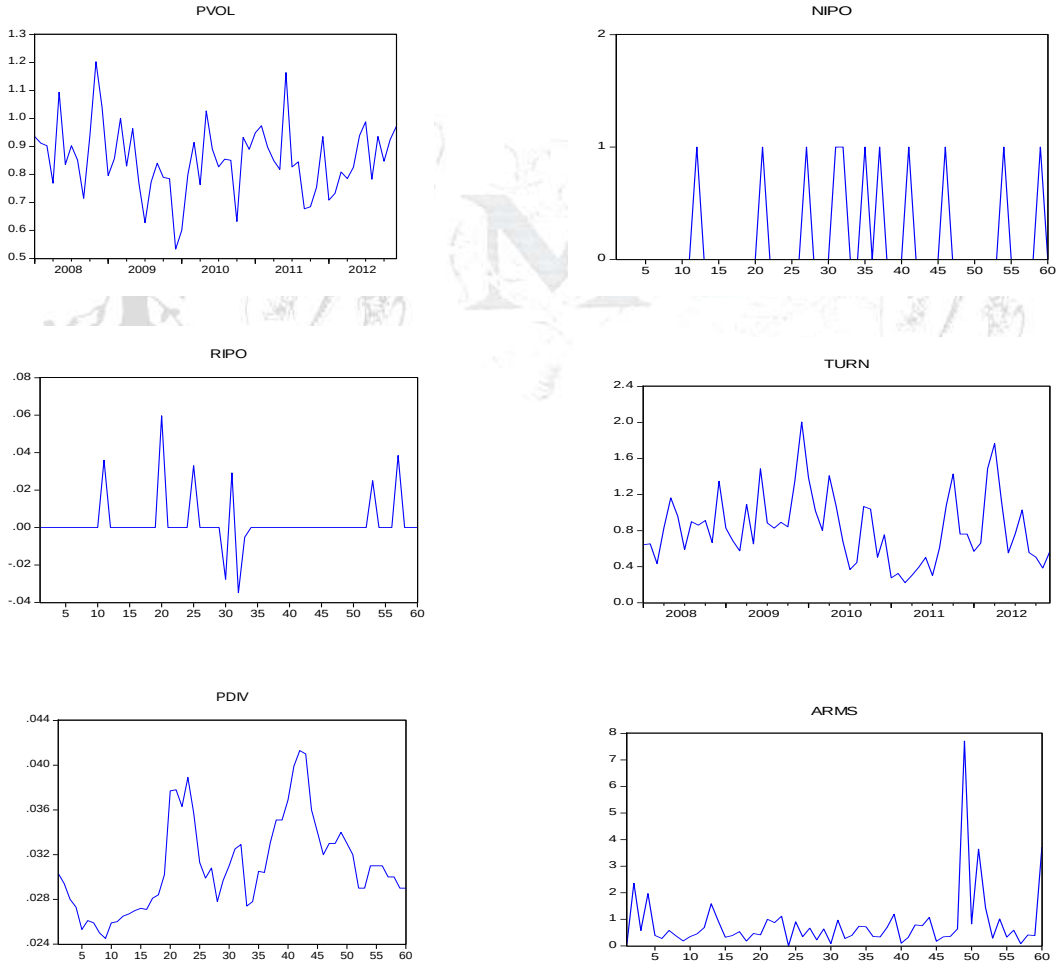
Table (1) summarizes the descriptive statistics and correlation matrix of indicators of feelings and sentiment index component.

	PVOL	NIPO	RIPO	TURN	PDIV	ARMS	ICS
Mean	0.854424	0.183333	0.002562	0.826244	0.031028	0.827828	0.961041
Maximum	1.202734	1.000000	0.059655	2.005570	0.041300	7.709144	7.501675
Minimum	0.533172	0.000000	-0.034821	0.222763	0.024500	0.000000	-0.489711
Std. Dev.	0.126543	0.390205	0.013344	0.382964	0.004153	1.151464	1.135732

Table (2) : The descriptive statistics of the indicators which froms the composite index of feeling and their correlations

	PVOL	NIPO	RIPO	PDIV	ARMS	TURN	ICS
PVOL	1.000000	-0.127349	-0.125525	0.028395	0.257956	-0.433972	-0.008068
NIPO	-0.127349	1.000000	-0.110155	0.153637	-0.089676	0.027898	0.174021
RIPO	-0.125525	-0.110155	1.000000	0.040666	-0.034969	-0.117125	-0.071586
PDIV	0.028395	0.153637	0.040666	1.000000	0.084334	-0.116126	0.082190
ARMS	0.257956	-0.089676	-0.034969	0.084334	1.000000	0.038849	0.903688
TURN	-0.433972	0.027898	-0.117125	-0.116126	0.038849	1.000000	0.376619
ICS	-0.008068	0.174021	-0.071586	0.082190	0.903688	0.376619	1.000000

We note that the maximum index component feeling is **7.501675**and the minimum is **-0.489711**, this indicates an index of sentiment extreme asymmetric during the study period. Moreover, ARMS had the highest correlation with the sentiment index (**0.903688**) and the second is the TURN **(0.376619**).
Subsequently we present the variation of the indicators used in this study feelings and sentiment index component



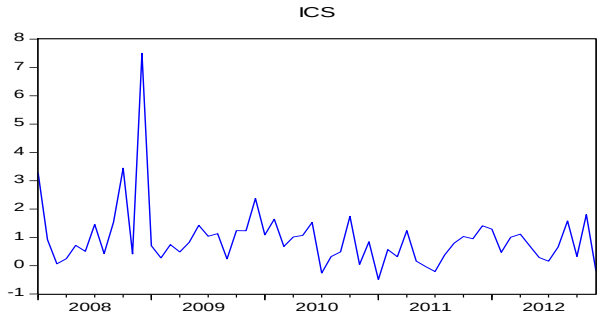


Figure (1) : the evolution of sentiment indicators

Overall, the evolution of the ICS aligns with the history of bubbles and crashes, in fact we see two spades in October 2008 and January 2011, respectively, which corresponds contagion international Subprime and revolution « Jasmine " Tunisia. This agreement suggests that the composite index captures changes appropriate sentiment factor. In the empirical work below, we use the composite index of equation (2.1) as a measure of investor sentiment.

Sample Data Used

We can define the Tunisian financial market in terms of market capitalization as a narrow market given the limited number of companies that are listed, the market is dominated or composed by a very large number of companies in the financial sector. It uses a representative sample of the Tunisian market composed of 41 companies that are Air Liquide Tuniisie, Amen Bank,Astree,Atb, Atl,Alkimia, Attijari Bank , Bh,Biat, Adwya, Assad, Bna,Bt, Bte, Cil, El Wifek Leasing, Electrostar, Essokna, Gif Filter, Icf, Magasin General, Monoprix,Placement Tunisie Sicaf,Sfbt, Siame,Simpar,Siphat,Sits,Somocer,Sotetel,Sotrapil,Sotumag,Sotuver,Spdit, Star,Steq,Tpr,Tuninvest Sicar , Tsie Leasing, Ubci, Uib,.. The choice of the number of companies (sample) is due to the availability and continuity of market data on current and securities exchanged.

We selected as sample all companies listed on the Tunisian market between 2008 and December 2012. The accounting and financial data were collected respectively in the database « BVMT " and the sample includes all listed securities for which data are available.

For individual titles:

$$R_{it} = \left(\frac{P_{it} - Pi_{t-1}}{P_{it-1}}\right) + D_t \quad (2)$$

The profitability of portfolios is calculated by

$$R_{pt} = \sum_{i=1}^{N} wi\ Rit \quad (3)$$

With

- Pit the closing price of stock i at time t,
- N is the number of titles available at time t
- And wi the weight of each company measured by market capitalization ratio of the company / total market capitalization.

we build 10 portfolios based on business characteristics, for chatting portfolios profitability securities small / large caps, young / mature, low / very profitable, low / very tangible and low / high opportunity , and weak/strong dividends we adapt the median.

Table (2.2) presents the descriptive statistics on the characteristics of portfolios:

- Panels A regroup criteria associated with the size, represented by its market capitalization (CB).
- Panel B includes criteria associated with age, estimated by the number of least since the introduction of the title in the database
- Panel C include criteria related to profitability, profitability is determined by the profitability of the company (ROA) is the ratio of income before taxes and interest / total assets.
- The panel D presents the criteria for tangibility. We retain the ratio Tangible / total active (IC / AT) to represent the degree of tangibility firms
- The panel E regroupes the criteria for the policy of dividend, such as the ratio of dividend is defined by the report of ratio of dividends distributed on equity capital.

Before presenting the methodology, results and interpretations, it should be noted that the TSE is a public institution with a commercial legal personality and financial autonomy, it is reacted with the provisions of the Commercial Code and member international organization of securities commissions, its mission is divided into three roles: BVMT responsible for managing market STICODEVAM responsible for compensation, deposits and securities settlement: both organizations take the form of private inter constituted by brokers. The third part of the trilogy of the structure is represented by an entity coating the public nature of market surveillance and enforcement of regulatory offenses.

In addition to the theoretical framework, the anecdotal evidence of the Internet bubble in the late 90s suggests that the returns and sentiment indicators can form a system. When the market peaked, sentiment indicators often show a record level. So you could have a feedback effect between the feeling and the financial market. For this reason, we use the VAR model (Sims 1980) and the study of causality between returns and sentiment. The advantage of using a VAR model is that it allows one hand to analyze the effects of one variable on another through simulations of random shocks via impulse response functions, and secondly to conduct an analysis in terms of causality via Granger tests. Before embarking in the presentation of results of the parameter estimation is proposed to take a glance on some elements descriptive statistics and then move to testing stationarity of the series.

Table (3): Descriptive statistics of the variables used

Variable of classification	Portefolio	Mean	Median	Maximum	Minimum	Skewness	Kurtosis	Jarque-Bera	Probability	Std.dev
Size	Small	0.001793	0.001061	0.021889	-0.012933	0.686294	5.844250	24.93438	0.000004	0.005924
	Big	0.007190	0.003879	0.073085	-0.078070	-0.257437	3.888924	2.638199	0.267376	0.028755
Age	Young	0.000839	0.000196	0.012276	-0.008483	0.651588	5.098724	15.25727	0.000486	0.003482
	Matures	0.008143	0.005686	0.072824	-0.084770	-0.343294	3.972211	3.541494	0.170206	0.030600
Profitability	Weak	0.006089	0.001717	0.067734	-0.068993	-0.046827	3.960069	2.326258	0.312507	0.026122
	Strong	0.002893	0.002891	0.023683	-0.024698	-0.484096	4.542188	8.289347	0.015849	0.008904
Tangibility	Weak	0.005740	0.001643	0.068883	-0.069627	-0.147880	3.878472	2.147966	0.341645	0.026105
	Strong	0.003243	0.004159	0.028543	-0.021080	-0.006884	3.876124	1.919459	0.382997	0.009318
The policy of dividend	Weak	0.005719	0.000991	0.066283	-0.062751	0.015122	4.031575	2.662652	0.264127	0.024501
	Strong	0.003263	0.002342	0.029416	-0.027956	-0.555595	4.275301	7.152843	0.027976	0.010458
ICS		0.961041	0.766068	7.501675	-0.489711	3.477029	19.87176	832.5377	0.000000	1.135732

We note that for the main series returns for all portfolios and characteristic variables, the null hypothesis of normality is rejected. We note first that the kurtosis coefficient is very high, that is to say, much higher than 3 (theoretical value of the coefficient of kurtosis for a normal distribution). This phenomenon of excess kurtosis confirms by the highly leptokurtic series stock returns. In the second place, the coefficient is different from 0 Skweness (theoretical value of the coefficient of Skweness for normal distribution), we find that the coefficient Skweness in some cases, was positive for the series of returns of portfolios (ranked by size and age (small) and low dividend policy) indicates that the distribution of negative and biased series and series portfolios profitability characteristic variables (size (large), Age (mature) of (weak and strong)

profitability and tangibility and a significant dividend policy) which indicates that the distribution of negatively biased series remaining. This illustrates the presence of asymmetry, which can be an indicator of non-nonlinearity. We find that the null hypothesis of normality is rejected for for the series studied. as accordingly series, stock returns do not follow a normal distribution, which is a general characteristic of financial series.

In summary, this preliminary study statistical properties highlights the following features:

(I) The series of stock returns of all portfolios and characteristic variables did not follow a normal distribution and characterized by:
(Ii) Excess Kurtosis.
(Iii) An asymmetric distribution indicative of non-linearity.

The result show the evolution of the series of two variables gives us a first intuition about the stationarity of these variables, they trace their evolution over time. It appears that all the series are stationary because they show no trend and converge to their long-term averages and are characterized by an instability that varies over time with the less volatile periods. At this level of advancement of our study, it is important to analyze the stationarity of all portfolios and ICS. Indeed, it is necessary to test the null hypothesis of no unit root. We then test the presence of a unit root in the process by testing the nullity of the parameter φ using Statistical weld, and the results of ADF and PP are presented in the table below:

Table (4) : stationarity tests

Variable of classement	Portfolio	ADF		Pp		Critical value		Stat
		With constant	With constant and trend	With constant	With constant and trend	With constant	With constant and trend	
Size	Small	-6.124967	-6.086039	-6.082544	-6.040608			yes
	Big	-6.756040	-6.796131	-6.717773	-6.757553			
Age	Young	-5.890155	-5.833719	-5.890155	-5.833719			yes
	Matures	-6.638380	-6.679886	-6.595314	-6.635816			
profitability	Weak	-6.753654	-6.878936	-6.717761	-6.883008			yes
	Strong	-5.931877	-5.875110	-5.960497	-5.905587			
Tangibility	Weak	-6.845904	-6.960006	-6.852038	-6.960006	1% :3.546099	1% :4.121303	yes
	Strong	-5.805009	-5.744624	-5.830765	-5.772129	5% :2.911730	5% :3.487845	
Distribution of dividend	Weak	-6.957237	-7.054618	-6.931457	-7.056399	10% :2.593551	10% :3.172314	yes
	Strong	-5.814587	-5.755178	-5.820351	-5.760301			
ICS		-4.406147	-8.331148	-8.050541	-8.290468			yes

From Table stationarity tests ADF, PP performed on the series of portfolio returns and ICS, we note that all the series used are stationary. Start with the ADF test (with constant), the (Rpt) (ICS) have values that are less ADF critical values not displayed directly EVIEWS, according ADF test (with constant and trend), the above variables have values are also below the critical values for the three levels 1%, 5% and 10% (see annexes). The same holds for the PP test, as can be noticed that the return series of all portfolios and ICS have a t-test of PP at different lower critical values recorded by Eviews. For the model (with constant).

According to PP (with constant and trend), the series have already mentioned PP values which are below the critical values for the three seuils1%, 5% and 10%, hence the rejection of the null hypothesis H0 « there is a unit root process is therefore not stationary « test PP. It can be noted as well as the probability of

accepting H0 for all series in both stationarity tests: ADF and PP is zero, we can conclude that all series stationary in its level.

Estimation of the VAR Model:

The VAR model is an econometric model used to capture the interdependencies between multiple time series and trends, all the variables in the VAR are treated symmetrically by including for each variable an equation explaining its evolution based on these specific delays and offsets of all other variables in the model, based on this feature.

Determination of the Number of Delay:

The determination of the lag order is an essential step for the estimation of our VAR model to do this it was based on two criteria namely the information criteria SCHWARTZ amended (SC) and the criterion Akaike that are considered effective in determining the lag order of vector autoregressive models (VAR), these criteria showed us an order optimal delay equal to 1 for all portfolios.

Table (5): the criteria for choosing the optimal lag order of the VAR model

Retards	1	2	3	4	5	LM
AIC (weaklyCB)	**-4.215947***	-4.115631	-4.056342	-3.934905	-4.122488	131.6591
SC (weaklyCB)	**-4.142953***	-3.896649	-3.691372	-3.423947	-3.465542	
HQ (weaklyCB)	**-4.187720***	-4.030949	-3.915205	-3.737313	-3.868442	
AIC (Strong CB)	**-1.071030***	-0.954929	-0.917194	-0.925518	-1.46012	47.90272
SC (Strong CB)	**-0.998036***	-0.735947	-0.552224	-0.414561	-0.389067	
HQ (Strong CB)	**-1.042802***	-0.870247	-0.776057	-0.727927	-0.791966	
AIC (young companies)	**-5.289745***	-5.205797	-5.146136	-5.032464	-5.246196	162.5886
SC (young companies)	**-5.216751***	-4.986815	-4.781166	-4.521506	-4.589250	
HQ (young companies)	**-5.261518***	-5.121115	-5.004999	-4.834872	-4.992150	
AIC (matures companies)	**-0.942320***	-0.828595	-0.788238	-0.792938	-0.906483	43.93090
SC (matures companies)	**-0.869326***	-0.609614	-0.423268	-0.281981	-0.249538	
HQ (matures companies)	**-0.914092***	-0.743913	-0.647101	-0.595347	-0.652437	
AIC (weak profitability)	**-1.254373***	-1.137444	-1.086730	-1.035878	-1.217157	52.60218
SC (weak profitability)	**-1.181379***	-0.918462	-0.721761	-0.524921	-0.560212	
HQ (weak profitability)	**-1.226146***	-1.052762	-0.945593	-0.838287	-0.963111	
AIC (strong profitability)	**-3.422633***	-3.328091	-3.316295	-3.306286	-3.235245	107.4750
SC (strong profitability)	**-3.349639***	-3.109109	-2.951325	-2.795328	-2.578300	
HQ (strong profitability)	**-3.394406***	-3.243409	-3.175158	-3.108694	-2.981199	
AIC (weak tangibility)	**-1.255994***	-1.138331	-1.097723	-1.066434	-1.226552	52.85660
SC (weak tangibility)	**-1.183000***	-0.919349	-0.732753	-0.555476	-0.569607	
HQ (weak tangibility)	**-1.227766***	-1.053649	-0.956586	-0.868842	-0.972506	
AIC (strong tangibility)	**-3.328206***	-3.243647	-3.174895	-3.138099	-3.214589	107.0420
SC (strong tangibility)	**-3.255212***	-3.024665	-2.809925	-2.627142	-2.557643	
HQ (strong tangibility)	**-3.299979***	-3.158965	-3.033758	-2.940508	-2.960543	
AIC (weak dividend)	**-1.385992***	-1.262852	-1.211321	-1.146619	-1.337654	55.89918
SC (weak dividend)	**-1.312998***	-1.043870	-0.846351	-0.635661	-0.680709	
HQ (weak dividend)	**-1.357765***	-1.178170	-1.070184	-0.949028	-1.083608	
AIC (strong dividend)	**-3.089185***	-3.004174	-2.969507	-2.987561	-2.911952	98.77052
AIC (strong dividend)	**-3.016191***	-2.785192	-2.604537	-2.476603	-2.255006	
AIC (strong dividend)	**-3.060958***	-2.919492	-2.828370	-2.789969	-2.657906	

The following table shows the estimated parameters of the VAR model and shows the relationship between the different variables of the model, it presents the results of the full sample VAR model of bi diverse portfolio performance (Rpt) and ICS. For each coefficient, the value was estimated standard error and t value statistics.

The Estimation Results of the Var Model

Table (6): Results of estimation of the VAR model (1)

	Rpt (-1)	Rpt (-2)	ICS (-1)	ICS (-2)	C
Small firme (weak CB)	0.220838 (0.13737) [1.60766]	-0.128496 (0.13773) [-0.93298]	2.62E-05 (0.00073) [0.03584]	-1.02E-05 (0.00071) [-0.01447]	0.001662 (0.00132) [1.25979]
ICS	-11.23758 (25.4175) [-0.44212]	-5.150753 (25.4840) [-0.20212]	-0.037325 (0.13526) [-0.27596]	0.210015 (0.13061) [1.60800]	0.785494 (0.24412) [3.21765]
Big firme (strong CB)	0.139330 (0.13687) [1.01794]	-0.168613 (0.13699) [-1.23082]	0.003171 (0.00359) [0.88324]	0.000458 (0.00348) [0.13181]	0.004259 (0.00636) [0.66976]
ICS	2.506168 (5.20428) [0.48156]	-2.193953 (5.20879) [-0.42120]	-0.022023 (0.13651) [-0.16133]	0.197346 (0.13222) [1.49254]	0.749653 (0.24177) [3.10067]
Young firms	0.259395 (0.13796) [1.88021]	-0.131002 (0.13853) [-0.94569]	-3.26E-05 (0.00043) [-0.07595]	-0.000268 (0.00041) [-0.64695]	0.001041 (0.00078) [1.33596]
ICS	-23.58639 (43.8561) [-0.53781]	-3.848344 (44.0355) [-0.08739]	-0.045612 (0.13630) [-0.33465]	0.206167 (0.13169) [1.56556]	0.790553 (0.24762) [3.19255]
Matures firms	0.154368 (0.13670) [1.12926]	-0.159938 (0.13675) [-1.16959]	0.003303 (0.00380) [0.86814]	0.000736 (0.00369) [0.19958]	0.004677 (0.00676) [0.69176]
ICS	2.103613 (4.89083) [0.43011]	-2.101318 (4.89256) [-0.42949]	-0.024547 (0.13612) [-0.18034]	0.198798 (0.13196) [1.50650]	0.752954 (0.24189) [3.11280]
(weak profitability)	0.135574 (0.13622) [0.99526]	-0.159199 (0.13659) [-1.16550]	0.002791 (0.00325) [0.85934]	0.000430 (0.00315) [0.13656]	0.003449 (0.00573) [0.60176]
ICS	2.064157 (5.70451) [0.36185]	0.231656 (5.72017) [0.04050]	-0.030272 (0.13603) [-0.22254]	0.206261 (0.13189) [1.56391]	0.736156 (0.24002) [3.06711]
(strong profitability)	0.231358 (0.14198) [1.62948]	-0.015254 (0.14222) [-0.10725]	0.000471 (0.00111) [0.42322]	0.000235 (0.00108) [0.21778]	0.001639 (0.00204) [0.80361]
ICS	6.697938 (17.0307) [0.39329]	-29.50340 (17.0597) [-1.72942]	-0.023892 (0.13347) [-0.17900]	0.169379 (0.12953) [1.30767]	0.849340 (0.24468) [3.47124]
(weak tangibility)	0.120557 (0.13603) [0.88623]	-0.169684 (0.13636) [-1.24436]	0.002948 (0.00325) [0.90823]	0.000739 (0.00315) [0.23483]	0.002790 (0.00571) [0.48876]
ICS	2.569654 (5.70058) [0.45077]	-1.791811 (5.71436) [-0.31356]	-0.025751 (0.13601) [-0.18934]	0.200460 (0.13185) [1.52035]	0.747952 (0.23917) [3.12730]

(Strong Tangibility)	0.260560 (0.14056) [1.85373]	-0.044678 (0.14073) [-0.31747]	0.000340 (0.00115) [0.29509]	-0.000107 (0.00112) [-0.09553]	0.002380 (0.00213) [1.11743]
ICS	-0.318159 (16.6070) [-0.01916]	-8.966348 (16.6271) [-0.53926]	-0.036131 (0.13617) [-0.26535]	0.198953 (0.13209) [1.50616]	0.794929 (0.25163) [3.15917]
Weak distribution of dividend	0.102777 (0.13658) [0.75251]	-0.149302 (0.13654) [-1.09349]	0.002626 (0.00306) [0.85721]	0.000529 (0.00297) [0.17799]	0.003230 (0.00541) [0.59696]
ICS	2.059672 (6.07510) [0.33903]	-0.050716 (6.07324) [-0.00835]	-0.029482 (0.13628) [-0.21634]	0.205873 (0.13216) [1.55775]	0.738510 (0.24068) [3.06849]
Strong distribution of dividend	0.258328 (0.14012) [1.84368]	-0.060351 (0.14027) [-0.43026]	0.000549 (0.00129) [0.42521]	0.000117 (0.00125) [0.09337]	0.002042 (0.00235) [0.86985]
ICS	6.071224 (14.5532) [0.41717]	-19.12234 (14.5689) [-1.31254]	-0.025688 (0.13410) [-0.19156]	0.187910 (0.12991) [1.44649]	0.811362 (0.24384) [3.32741]

We note that the returns of portfolios of all the characteristic depends negatively delayed by a period of ICS value, while ICS depends positively on the lagged one period of performance and value. for example, large firms (large capitalisation) their coefficientis (2.506168), for mature companies (2.103613), little businesses and profitable it is to say, a low or high profitability (2.064157) and (6.697938), the less tangible firms (2.569654), and end firms has low or high dividend distribution policy (2.059672), (6.071224) these values are greater than the critical value which is about 1.96 to a 5% level, one can interpret this by the existence of relatively zero coefficient positive and explains the positive effect of certain portfolios returns on sentiment to a level of a delay of 1.

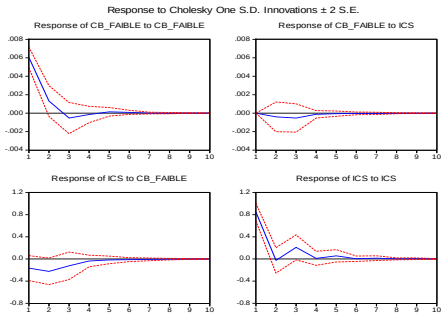
The cumulative effect of sentiment on the return of monthly portfolios is negative and significantly different from zero, since the t-statistic of student feeling a level of delay (1) is not significant, for example ups (- 0.07595), this value is less than the critical value which is about 1.96 at a 5% level, this can be interpreted by the existence of a relatively non-zero coefficient and negative (-3.26E-05) which explains the negative stock returns-feeling at a level of a delay of one relationship.

This brings us back to say that there is no relationship between (Rpt) and (ICS). Also observed in the positive effect of variable (Rpt) in terms of delay (1) on itself at time t is presenting value of t-statistic is (0.259395). We can therefore conclude that the feeling for all levels of delay can not positively influence the performance of the portfolio.

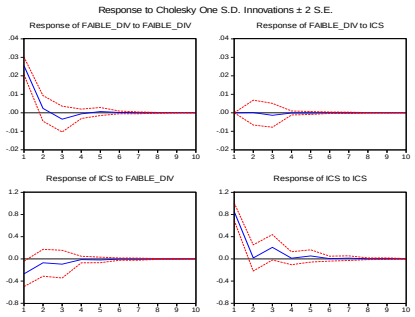
Impulse Response Function

This function traces the effect of a shock of one standard deviation, innovation on current and future values of the endogenous variables. Our VAR model that describes a relationship between the portfolio yield () and sense (ICS).

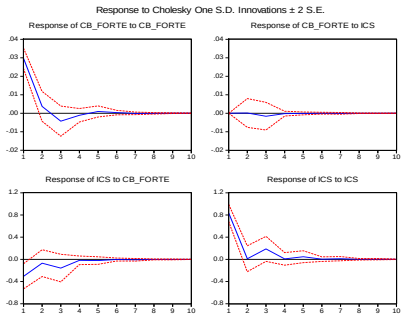
And represent two innovations. It seeks to identify the impact of a shock unit on () at time t, depending on the dynamic variable (S) to periods after t and vice versa, assuming the changes in these two variables t and T known data according to the charts of these coefficients and their associated values, we can see that we find the general shape of the response function to an innovation. VAR coefficient estimates can not capture the full impact of an observation of the endogenous variable. For this, the impulse response functions all use the coefficient estimates VAR to trace the full impact of residual shock. FIG contain possible graph of impulse response function using the estimate of VAR.



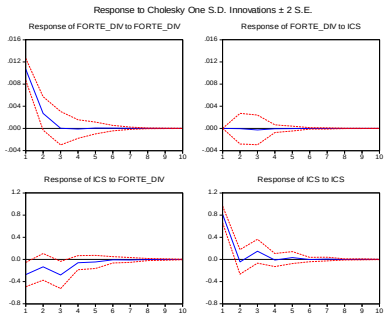
Weak market capitalization



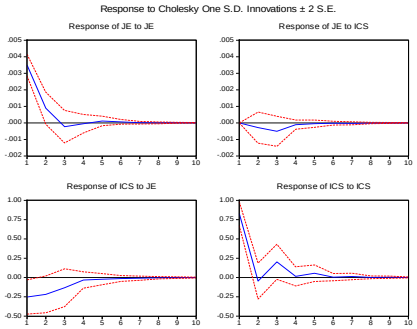
Weak distribution of dividend



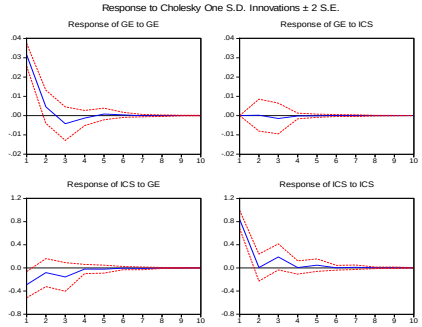
Storng market capitalization



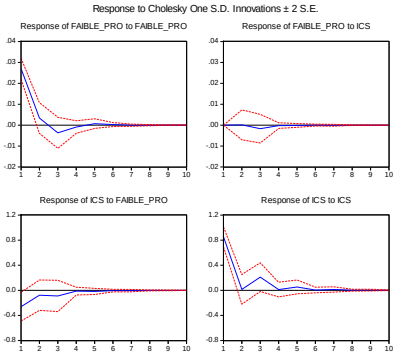
Strong distribution of dividend



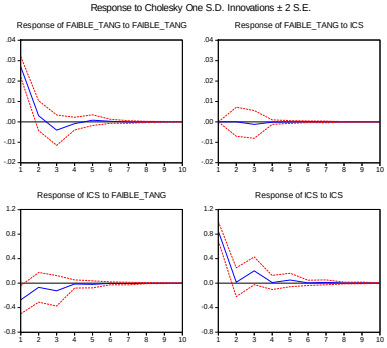
Young firms



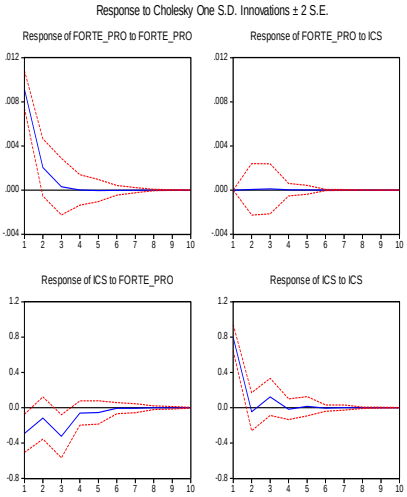
Matures firms



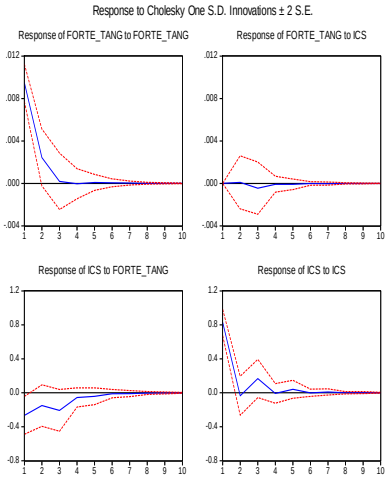
Weak profitability



weak tangibility



Strong profitability



Strong tangibility

Fig (2) Function of response of impulse

For graphs (1) and (2) (R to R and R to S), they trace the response of portfolio performance to a standard deviation shock to each variable on themselves and feeling. The vertical axis in these graphs measure the percentage increase in R. For graphs (3) and (4) (S to R and S to S), they trace the response of feeling a shock standard deviation respectively of the portfolio return and the variable themselves. Table impulse responses of innovations (in the Appendix), we can learn about the purpose of our study, because the representation of responses to shocks ® and (S) for later periods.

On the one hand, the profitability monthly portfolio has zero response during the first period after following a shock of feeling, and the series of returns shows a decrease during the second and then the third period after an increase during the following periods and return it to the equilibrium point during the sixth period after a correction process, as the shows a positive response and the persistent feeling of shock ® and the realization of impulse response for relatively large after the first three periods, but this impulse response continues to decrease gradually return to equilibrium through a process of correction during the seventh period after this leads us to reveal our hypothesis node. This result is interpreted as evidence that portfolio returns have a negative impact on investor sentiment and conversely.

Causality Tests (Granger)

Causality tests of Granger (1969) were performed to check the direction of causality between the returns of different portfolios and investor sentiment (ICS). This test is used to examine whether there is a positive relationship between trading volume and market returns, you must use the Granger causality test (1969.1988) because it examines a double causality between two variables, a set of processes () j = (1 ... q), if there is a causal link between (and (), this means we can better predict (using past values).

In the Granger sense, a series of profitability « cause " of the series sense if knowledge of past profitability improves prediction of feeling and / or vice versa. Thus, the causality tests are used to highlight the direction of the causal relationship between the returns of each portfolio and ICS. Taking into account the ICS can - it improve the prediction of returns and / or vice versa?

Test 1: H0: the feeling does not predict the direction of Granger returns
Test 2: H0: the returns do not predict the Granger sense

Table (7): results of Granger causality tests between returns and investor sentiment

	Test 1		Test 2	
	F-Statistique	**P-Valeur**	**F-Statistique**	**P-Valeur**
Weak CB	0.00076	0.9992	0.14041	0.8693
Strong CB	0.39841	0.6734	0.18197	0.8341
Young firms	0.21061	0.8108	0.16654	0.8470
Matures firms	0.39552	0.6753	0.16226	0.8506
Weak profitability	0.37731	0.6875	0.06905	0.9334
Forte profitabilité	0.11208	0.8942	1.49579	0.2334
Weak tangibility	0.43817	0.6475	0.13708	0.8722
Strong tangibility	0.04874	0.9525	0.15860	0.8537
Weak distribution of dividend	0.38198	0.6844	0.05777	0.9439
Storng distribution of dividend	0.09410	0.9103	0.86735	0.4259

It can be seen that the performance of portfolio does not cause the direction of the Granger sense is accepted because the probability is relatively high (0.05) As well, we note that if the yield is used as the dependent variable and the explanatory variable is the feeling the probability is greater than (0.05), which says that the null hypothesis that the feeling does not cause any performance portfolio in the sense of Granger is accepted, it allows us to conclude that n is not a dual granger causality between performance and sentiment.de there, we can conclude that there is no relationship retroactive (feedbak) between these two variables for all portfolios. Except for the companies which have a strong profitability can predict the feeling seen that the probability is very close to 0.05 and which is worth (0.0569).

Conclusion

Although several studies based on surveys to measure investor sentiment, Brown and Cliff (2004), Brown and Cliff (2005), Otoo (2009), the use of surveys can also be problematic because of inaccurate responses, misunderstood questions, Bertrand and Mullainathan (2001), and non-response bias, Groves (2006). Therefore, documents such as Lee, Thaler and Shleifer (1991) and Dorn (2009) suggest using indirect indicators. Baker and Wurgler (2006) form a sentiment index based on the first principal component of a number of indirect proxies. In our study we construct a composite index of sentiment which includes six proxies.

The first proxy(PVOL) is the log ratio of the equal-weighted average market-to-book ratios of stocks with high idiosyncratique volatility (top three deciles) and with low idiosyncratic volatility (bottom three deciles).

The second proxy PDIV (the priumin of dividend) : it is the difference between dividends received and the paid dividends

The third proxy ARMS (index performance) : the number of the titles which knew a progression of coutyards standardized by their volumes exchanges divided by the number of the titles which knew a decrease of the lectures standardized by the volumes of exchange of these titles.

The fourth proxy is NIPO : The monthly number of firms newly introduced.The fifth proxy is RIPO Profitability : average monthly first day of trading companies newly introduced. The sixth proxy is TURN : number of shares traded / number of shares outstanding.

In a market of short sales, the irrational investors participate and increase liquidity in a market where investor sentiment is positive (Bris, Goetzmann, and Zhu (2007)). All data are monthly frequency and cover the period from January 2008 to December 2012. Our result confirms the results found by Solt and

Statman (1988), testing the influence of sentiment index from Dow Jones over the periods 1963-1985 and they find that the feeling is not a reliable signal to transact exchange. Indeed, there is no significant relationship between investor sentiment and Clark and Statman (1998) did the same test on the S & P500 over the periods 1963-1995 and confirms the result found by Solt and Statman (1988). Shiller (2000) tested a weak relationship between confidence indices of Yale University and several other proxies of investor sentiment. De Bondt (1993) shows a significant negative relationship between sentiment index and future returns, what contradicts the results of previous studies. Brown and Cliff (2005) confirms in his article that examines the long-term correlation between the index and the feeling returns, the importance of investor sentiment in the valuation of financial assets

The use of VAR (1) on the Tunisian stock market over the period 2008 to 2012 leads us to conclude the absence of a significant relationship between investor sentiment and performance, and thus we see that the feeling is not a reliable signal to operate the Tunisian stock exchange transactions. According to the Granger causality tests we can conclude that there is no relationship retroactive (feedbak) between these two variables for all portfolios.

This result is contradictory to Brown and Cliff (2004) who reject the conventional view that investor sentiment affects the small caps. In addition, we confirm that young and mature firms, with (low/high) profitability and tangibility, and the small and large titles, with (weak/strong) politcy of distribution of dividend are weakly influenced by investor sentiment. On the other hand, as other researchers had already found, we find that investor sentiment is not affected by past returns. The question that may arise in this step if the results will change and improve the application of nonlinear model or not?

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