



## How Does Financial Sector Reacts After Special Events? *An Event Study Analysis of Tunisia after the Revolution of 2011.*

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### ABSTRACT

Using an event study analysis, we aim to investigate the impact of political, economic, social and terrorism' events, on the Tunisian financial sector, over the period of the Tunisian Revolution; from (12)2010 to (04)2014. Based on a daily data analysis using three selected variables ; *Sectoral index of performance of Tunisian banks* ,*Index of Tunisian stock market and the exchange rate Euro/ Dinar*, the EGARCH model' results have highlighted that general events decrease the return of our variables, and increase their volatility. More, results have shown that stock market is very sensitive to political and terrorism events, bad economic events increase the volatility of the exchange rate, and decrease the performance of banking sector. Political events remain the more important component, they affect negatively all the endogenous variables; coefficients in the mean equation show an important decline in term of the return of banking sector ,the stock market and the exchange rate.

### Indexing terms/Keywords

Event study, EGARCH model, stock market volatility, exchange rate volatility, financial sector sensitivity.

### Academic Discipline And Sub-Disciplines

Management sciences, Economic, Finance.

### SUBJECT CLASSIFICATION

Jel classification - G14, C58, G12, F31, G11.

### TYPE (METHOD/APPROACH)

EGARCH model, Event study

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## INTRODUCTION

It is an undeniable fact today that the economic and financial sphere suffer from uncertainty, complexity and an alarming instability. We raise a growing vulnerability of economic and financial system; this vulnerability is fueled by an increased sensitivity of investors to the political and social climate. To analyze this inventory, a reading of the evolution of economic schools of thought finds its support. In fact in 1936, through his "general theory of employment interest and money", **Keynes** emphasized the necessity of state' role to bring stability, his finding was followed by the important contribution of the IS-LM model in the sixties. These works are based on the interaction of markets and the equilibrium at fixed prices, whereas the state of contemporary finance and economy highlights the importance of the behavioural component in a context of uncertainty; it is a passage to "behavioural economics." Recent research in management sciences emphasize the importance of the psychological aspect in explaining the behavior of investors, thus the cognitive school peels personal beliefs and their impact on economic and financial choices, behavioural finance tends to analyze financial investor behavior importance. (**Shiller (2003)**).

Changes in financial and economic variables are explained, in addition to basic economic and financial mechanisms by the effect of other type of variables, such as psychological and cognitive variables **Fama (1990)**, **Shiller (2003)** thus the border between the economic and financial sphere and the political and social sphere is deeply abolished with a strong interaction between them.

Our paper is among those lined, which tend to analyze, the impact of political social, economic and terrorism' events, on the financial sphere.

This paper is organized as follows: the first section will analyze the theoretical bases of the impact of events on the economic and financial sphere, to shade in a second section the inventory of the events discussed in the context of our paper, under the period of the Tunisian revolution. The empirical analysis will be the subject of a third section.

### Events' impact on economic and financial sphere

Analysis of financial variables is based on the fundamental analysis approach embodying the basic mechanisms and digital data; it is also based on the technical approach summarizing trends using graphs, and also on textual data from news (**Schumaker and Chei (2009)**). The analysis of **Fama (1990)** and **Shwert (1990)** showed that 50% of the variation in stock prices is explained by variables that fall outside the real economic activity. **Badarinza and Margaritov (2011)** stipulate important qualitative factors in explaining the dynamics of macroeconomic response and the bond yield term structure.

For **Roll (1988)** only one tier of the movement of stock prices is explained by economic variables, the remaining two thirds are explained by events occurring. **Shiller (1980)** shows that stock prices suffer of a great variation which is far from being solely explained by changes in interest rates or future cash flow estimated, there is a significant effect of other variable types. **French & Roll (1986)** based on two situations with similar fundamental for stock market; the most important change is estimated for an open market case more than a closed stock market. **Neiderhoffer (1971)** analyzes the stock market reaction to the news world, and he describes these as qualitative variables, and admits that they explain in large part the returns on the stock market. **Anderson and al. (2003)** analyzing the U.S. dollar spot exchange rates, they distinguish between the effect of bad news and good news, they find that the news "produce conditional mean jumps; hence high-frequency exchange rate dynamics are linked to fundamentals....The sign effect refers to the fact that the market reacts to news in an asymmetric fashion: bad news has greater impact than good news, which we relate to recent theoretical work on information processing and price discovery."

The interdependence of the various economic and financial variables, amplifies the depth of their volatility, several studies have focused on analyzing the impact of economic news on financial and economic variable; **Bittlingmayer (1992)** analyzes the impact of policy change, especially antitrust laws, on the stock market, focusing on the period between 1904 and 1944, he found that each policy have occurred a drop of 0.5 to 1.9 on the stock market, this founding can explain in major part overall movement of 1929' crash. **Schwert (1989)** through his paper, analyzing the Great Depression, says that excess volatility in the U.S. stock market, is due to an increased sensitivity to economic instability. **Culter, and al (1989)**, based on the analysis of the evolution of the 50 largest daily returns on the S & P 500 index over the period 1946-1987, showed an absence of full economic explanation, of these trends. **Badarinza and Margaritov (2011)** are interested in the role of information shocks on macroeconomic dynamics. Through the analysis of sample of quarterly U.S. macroeconomic aggregates (the quarterly growth rates of real GDP, consumption, investment and the real wage, hours Worked and the effective nominal federal funds rate, oven U.S. government bond yield zero coupon bonds for series with Maturities of 1, 3, 5 and 10 years, on the period 1971Q3 to 2008Q4., and using the medium-scale DSGE modeling framework of **Smets and Wouters (2007)**, they have found a minimal role of news on the evolution of productivity' factor, facing an important once in monetary policy and the overall dynamic behavior of the term structure of interest rates.

**Teo and al (1999)**, through the analysis of the effect of social movements boycott products of certain companies, on the South African financial market, using an events study; they found a minimal effect on the shares of target companies. **Koku and al (1997)**, analyzing the impact of social movements on the value of the firm, showed that "the value of target companies increased an average by 0.76% over the day the news became public. Secondly, the value of target companies grew only by 0.55% on the day that the information of the boycott threat became public. However, there is absence of statistically significant difference between the market reaction to boycott and threats of actual boycott. When combined, without distinction between boycotts and threats of actual boycott, the value of target companies increased on

average, 0.66%". **Dinardo and Hallock (2000)** emphasize the negative effects of strikes on the stock markets, through an investigation of the U.S. market over the period 1925-1937. The distinction conducted on the extent of the strike, and carrying on its outcome (recognizing the rights of employees or not), showed that in most cases it is not expected to Union victory, however, if it is the case, this result has an important effect on the share of firm profits going to stockholders.

Several studies have tried to analyze the impact of political events on the economic and financial life. These works stipulate, in addition to the effect of such news on future performance, the importance of increased uncertainty in the financial market that influences current prices at decisive level. **Bittlingmayer (1998)** addressing the German market, in the period after the First World War, shows that a climate of political uncertainty affect stock market volatility and output. **Kim and Mei (1994)** using **Fama (1990)** 'model on the Hong Kong stock market, illustrate that political progress, such as peace after war period, and influence positively stock market. The majority of papers analyzing the effect of political news, based upon events' analysis, tend to distinguish between the effects on short term windows and the effects on long-term windows, in order to discern the resonance and depth of the potential impact of these events, the contributions of **Neiderhoffer (1971)** and **Culter, Poterba and Summers (1989)**, are entitled among the investigations on the windows of short-term

The paradigm of Terrorism saw its peak in the late nineties. The bombings of 11 September 2000, upsets the world and have highlighted a major danger to the nations. Analyzed in terms of the economic and financial sphere, **Baumart Buesa and Lynch (2013)** through the analysis of the impact of Boston bombings on the stock market, comparing the abnormal performance following these events, and those of 30 days before the attack, showed the existence of abnormal trends. For "all this would appoint towards the fact that stock markets have learned to less overreact and evaluate the real economic consequences of a terrorist attack more objectively and also that the risk of such an attack is being included more systemically in share prices.". **Nikkinen and Vähämaa (2010)** stipulate that terrorist attacks increase the uncertainty on the stock market and create a remarkable downward trend in expected value (through an empirical investigation on the FTSE 100). **Karolyi, A, and R. Martell (2010)**, estimate losses on the stock market (significant negative stock price reaction of -0.83%, which is an average loss per firm per attack of \$401 million in firm market capitalization, also a human capital losses (kidnappings of company executives, bombings) in term of larger negative stock price reactions than physical losses) these reactions depend on the country.

## Events on the case of the Tunisian financial sector

January 14, 2011 a revolution was triggered in Tunisia, claiming political regime that ruled the country for 23 years. Its origins date back to the first protest movements during the month of December 2010, proclaiming the dignity of citizens, labour, human rights and social equality. Since than, a chain of political, social, economic and terrorism' events, has not ceased to shake the Tunisian daily. An overview on the state of evolution of the Tunisian economy shows a significant effect of the revolution on fundamentals (a drop of 2% in GDP, an important increase on government debt, a high increase for the unemployment rate).<sup>1</sup>

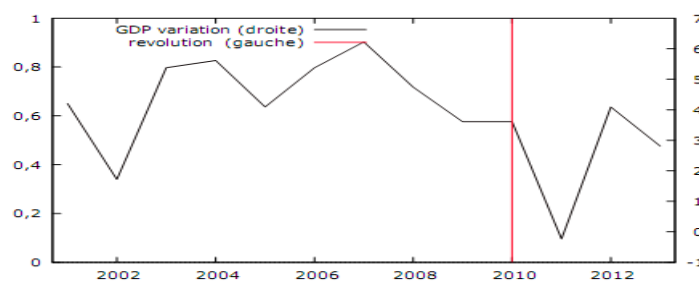


Fig.01 GDP evolution (basic year 2005).

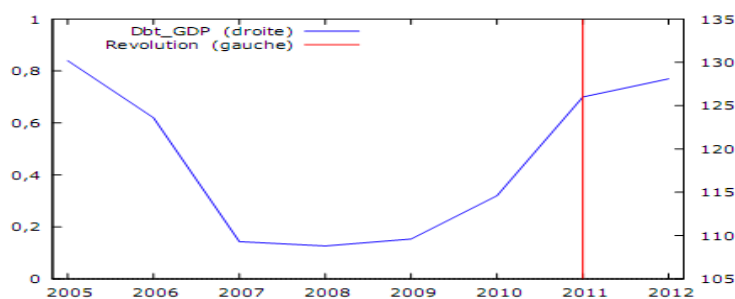
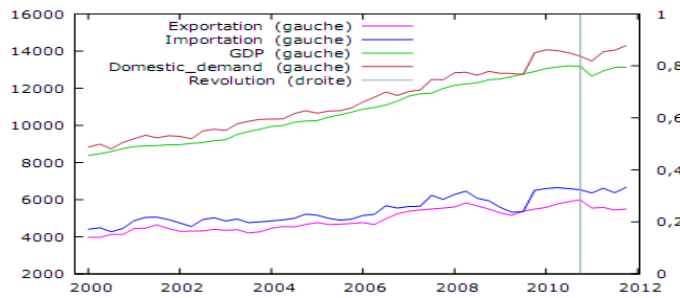
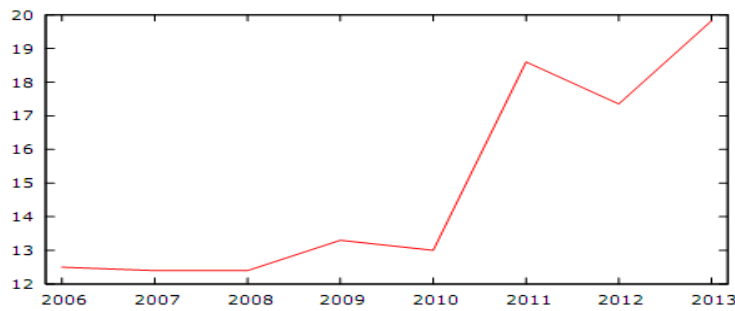


Fig.02 Debt as GDP%

<sup>1</sup> Data are available on *Tunisian Central Bank site* and *Tunisian National Institute of Statistics site*.



**Fig.03 Macroeconomic aggregates (2005 prices)**



**Fig.04 Unemployment evolution in Tunisia**

In this paper we analyse the impact of different event categories occurring during the period closely before and after the Revolution of 14<sup>th</sup> January, on the financial sector. These events are split on four categories: political events, economic events, social events, and events of terrorism. The following table gives an idea of this distinction.

**Table. 1 Events' typology.**

Type	Social	Economic	Politic	Terrorism
Example	Mohamed Bouazizi sets himself on fire.	IMF visits, reports and declarations about Tunisian economic situation.	Flight of the ousted president Ben Ali.	Assassination of political leader.
	Strikes.	World bank reports.	Failure of national dialogue.	Terrorist act of armed rebel group.
	Social manifestations and protest.	Deterioration of rating agencies.	Suspension of work of the Constituent Assembly.	
Nombre of News	42 events	69 events	67 events	16 events



## Empirical investigation

The purpose of this paper is to analyze the effect of political, economic, social and terrorism events, related to the period of the emergence of the Tunisian revolution in January 14, 2011, on the Tunisian financial market. Basing on autoregressive conditional heteroscedasticity specification ARCH of **Engel's (1982)**, we disentangle movement on return and volatility of financial variables on this specific case. Furthermore, to highlight the effect of bad news specifically we use asymmetric GARCH model, through exponential framework of **Nelson (1991)** EGARCH, in fact EGARCH model illustrates better the impact on volatility and return, through the distinction between good news and bad news, as well as importance degree.

### 1. Data set:

To test the hypothesis of time varying volatility and return under news of financial variables illustrating the Tunisian financial market, we select three daily principals' elements; *The Sectoral Index of Development of Tunisian Financial Sector*, the composite index of the Tunisian stock market *TUNINDEX*<sup>2</sup>, and the exchange rate *EURO/TND*<sup>3</sup>, these two later are used through their logarithm.

With:

*DLNTDIX*: TUNINDEX return measured by its differential logarithm.

*DLNERDT*: *EURO/TND* return measured by its differential logarithm.

*LNSF*: logarithm of The Sectoral Index of Tunisian Financial Sector. The Sectoral index of the Tunisian Financial sector is a composite index summarizing the performance of the different Tunisian financial institutions.

Financial data are collected from the Tunisian Central Bank Database and from the Tunisian Stock Market Database.

Events are collected in real time from mass media from December 01, 2010 to April 6, 2014, constituting 1,223 daily observations. On the whole period we have recorded 194 events. (42 social event, 69 economic event, 67 political event, 16 event of terrorism).

### 2. Statistical diagnostic of variables and ARCH effect test

Hereafter we examine the statistical properties of the three variables to assess normality. Specifically we calculate the coefficient of symmetry (skewness) and flattening (kurtosis) and we also use the Jarque and Bera (JB).

The following table shows the various descriptive statistics and the Jarque and Bera and the p-value associated with the test statistics for the three variables.

**Table. 2 Descriptive statistics.**

	DLNERDT	DLNTDIX	LNSF
Mean	0.000105	-0.000162	8.547066
Median	0.000000	0.000000	8.563493
Maximum	0.015158	0.041063	8.687245
Minimum	-0.013789	-0.041439	8.410073
Std. Dev.	0.002953	0.005739	0.057175
Skewness	-0.014204	-0.917134	-0.377843
Kurtosis	5.730647	20.16200	2.702453
Jarque-Bera	271.5678	10848.48	24.02033
Probability	0.000000	0.000000	0.000006
Sum	0.091784	-0.141174	7470.135
Sum Sq. Dev.	0.007613	0.028753	2.853773
Observation	1,223	1,223	1,223

<sup>2</sup> The *Sectoral Index of the Financial Sector* and *Tunindex* are extracted from the database of the Tunisian Stock Exchange.

<sup>3</sup> Historical data of the exchange rate are extracted from the database of the Central Bank of Tunisia.



The analysis of the descriptive statistics of our basic variables highlights the following findings; the coefficient of kurtosis is greater than 3 indicating the theoretical value of a normal distribution, the coefficient of symmetry *Skewness* is different from zero and negative (coefficient of a normal distribution) illustrating the presence of asymmetry, resulting in the fact that the volatility of the selected variables is lower after a pic rather than after a fall, there is a tendency leptokurtic because of the combination of volatility factors.

The values of *Skewness*, the *Kurtosis* and the *p\_value* related to *J.B* reveal some asymmetries in the selected series. This led us to a non-linear estimation and advocates the use of *ARCH* and *GARCH* processes. This type of measure of the conditional variance is more appropriate to measure the sensitivity of our variables to the effects of various news. *Jarque and Bera (JB)* statistics and its associated *p\_value*, highlight the rejection of the null hypothesis of non-linearity and accept the alternative hypothesis of heteroskedasticity, or existence of *ARCH / GARCH effect*.

In fact the statistical analysis conducted and the test and *JB* reject the normality assumption in favor of the phenomenon of asymmetry. Thus, variations of different financial variables often show significant variations (low) followed by small changes (important) unpredictable signs. This phenomenon has already been observed by **Engel (1982)** by developing a process of *ARCH*. To confirm the existence of *ARCH / GARCH effect*, we use the Lagrange multiplier test (*LM*). We assume in this context that *The Sectoral Index of Tunisian Financial Sector*, the *TUNINDEX*, and the exchange rate *EURO / TND*, follow an autoregressive process of order (*p*) as follows:

$$X_t = \phi_0 + \sum_{i=1}^p \phi_i X_{t-1} + \varepsilon_t \quad (1)$$

$$h_t = \alpha_0 + \sum_{i=1}^p \alpha_i \varepsilon_{t-1}^2 \quad (2)$$

$X_t$  : endogenous variable.

$h_t$  : conditional variance.

$\varepsilon_t$  error term  $idN(0, h_t^2)$ .

**Table.3 Results of Lagrange multiplier test (LM)**

ARCH Test:			
<b>Secorial index</b>			
LM-statistic	209.9746	Probability	0.000000
<b>Stok market</b>			
LM-statistic	128.0470	Probability	0.000000
<b>Exchange rate</b>			
LM-statistic	20.33147	Probability	0.000000

From this table we see that: the probability associated with the Lagrange multiplier statistic is well below the threshold standard risks. Therefore we accept the hypothesis of the existence of *ARCH effect*. We note that the autoregressive coefficients associated with the squared residuals delays are significantly different from zero.

To better understand the effect of bad news on the volatility of our selected variables, as explained above, we use an estimate on all of our series on two stages *EGARCH* model as proposed by **Geweke (1986)** and **Pantula (1986)**, using a non parametric *ARCH* specification :

① A first estimate embodying variable *Glev*: to discern the effect of news taken summarily. (Equation (3) and (4))<sup>4</sup>.

<sup>4</sup> *Glev* : Global event linked to the selected period.

*Sev* : Social event.

*Polev*: Political event.

*Ecov*: Economic event.

*Terev*: Terrorism event.



② A second estimate embodying specific news *Sev*, *Polev*, *Ecov* and *Terev*, iterated one by one: to explain the specific source of fluctuation in terms of volatility. (Equation (3) and (4)).

$$r_{x_i,t} = \phi_0 + \phi_1 r_{x_i,t-1} + \phi_2 Dummy + \varepsilon_{x_i,t}. \quad (3). \text{ Return equation}$$

$$\log(h_{x_i,t}^2) = \zeta + \alpha_1 g_{x_i,t}(z_{x_i,t-1}) + \beta \log(h_{x_i,t-1}^2) + \alpha_2 Dummy \quad (4). \text{ Volatility equation}$$

Where

$$g_{x_i,t}(z_{x_i,t-1}) = (|z_{x_i,t-1}| - E|z_{x_i,t-1}|) + \delta z_{x_i,t-1} \text{ and } z_{x_i,t-1} = \varepsilon_{x_i,t-1} / h_{x_i,t-1}.$$

$x_i$  : DLNTDIX, DLNERDT or LNSF.

$\phi_{i0}$  : constant.

$\phi_{i1,2}, \alpha_{i1,2}$  : coefficients.

$\zeta, \beta$  and  $\delta$  : conditional variance parameters.

$\beta_i$  : last period effect on conditional variance, the sign is important.

$\alpha_i$  : contribution of the previous period in the explanation of information related to residues, affecting the volatility of the period.

$\delta_i$  : distinctive effect between bad news and good news,

negative coefficient means that bad news has a greater effect on volatility.

The Dummy variables are constructed as follows:

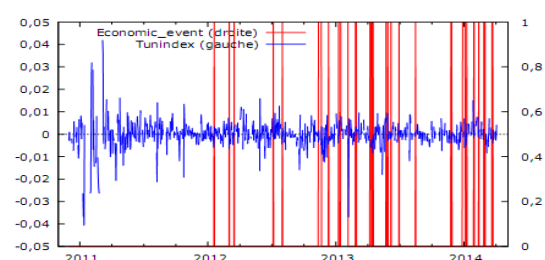
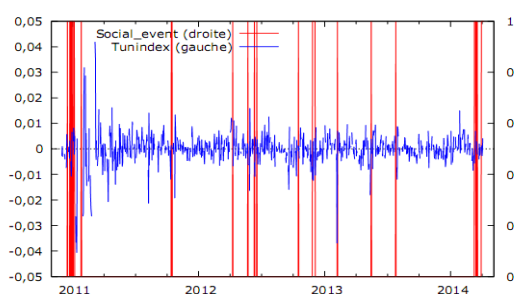
- *Glev*: global event represents total events as a *Dummy variable* has 1 in case of event's occurrence and 0 if not.
- *Sev*: social events as a *Dummy variable* has 1 in case of event's occurrence and 0 if not.
- *Ecev*: economic events as a *Dummy variable* has 1 in case of event's occurrence and 0 if not.
- *Polev*: politic event as a *Dummy variable* has 1 in case of event's occurrence and 0 if not.
- *Terev*: terrorism events as a *Dummy variable* has 1 in case of event's occurrence and 0 if not

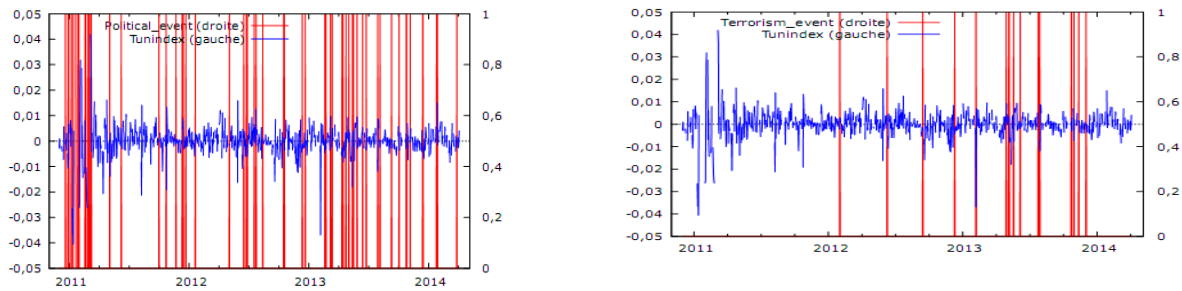
### 3. Estimation result:

The estimate of the effect of the news collected on *TUNINDEX* the *Index of the Tunisian Stock Market* using an *EGARCH* specification (1.1), has highlighted that; firstly a brief analysis of the effect of all the events presented through the variable global events on the performance of *TUNINDEX*, highlights the existence of a negative and highly significant impact on the performance level through the estimated coefficient in the mean equation (-0.217765), and there is a positive effect on the volatility (0.201025).

At this level we can conclude that the events recorded during the *Tunisian Revolution*, negatively impact, the return level of the Tunisian stock market and increases its volatility.

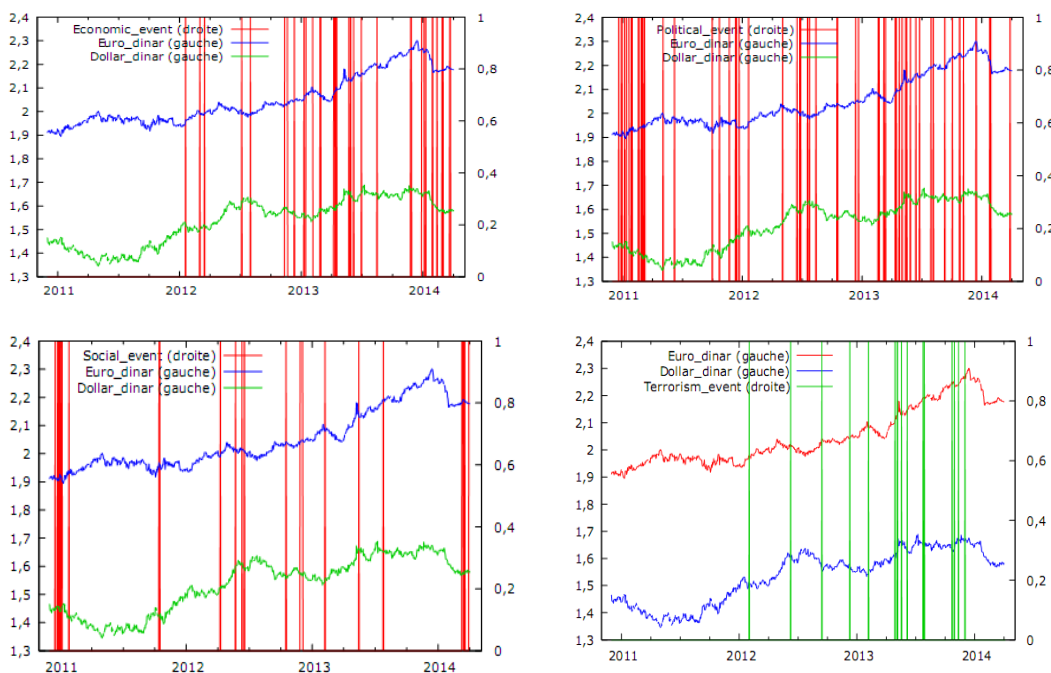
With the aim to provide further explanation of this first result, we choose to treat our series, under the effect of the different events separately. Based on *EGARCH* specification (1.1), it appears that the negative impact detected on the performance is mainly explained by political events (-0.001617) and terrorism (-0.008253), these events also increase the volatility in addition to social events. The stock market is, in this sense, sensitive to socio-political climate, financial investors, in the presence of political and social instability manifest financial reluctance, a preference for liquidity, and adopt a risk-averse behavior, economic stimulators, everything being equal will not give the desired effects. These results corroborate those of **Suleman (2012)**, **Gul and al (2013)** and **Dangol (2008)**, and refute those of **Voth (2001)**.





**Fig.06. Tunisian Stock Market Index fluctuation under specific news.**

The results found on the *Tunisian Stock Market Index* has been roughly confirmed by the sensitivity of the exchange rate *EUR / TND*. In fact the effect of the variable global event (*Glev*) on the level of the exchange rate appears weakly significant (-0.068314, *p\_value* 12%), however the effect on the increased volatility has been confirmed (0.414168). By the same logic, and in order to point out the origin of these effects, we estimate the specific effect of these events through an *EGARCH* model, the results stipulate a significant effect of political and economic events on the level of the exchange rate and volatility, and the absence of determinative effect of social and terrorism events.



**Fig. 07. Exchange rate fluctuation under specific news.**

We refine our empirical investigation, which seeks to determine the effect of political, economic, social and terrorism events on the Tunisian Financial Market in the period of the *Tunisian Revolution*, and we estimate their impact on the *Sectoral index of performance of Tunisian banks*. It appears that, broadly, there is a decrease in term of return (-0.048869) through the assessment of the *Sectoral Index* and a general increase in volatility (0.068812). The effect on performance is explained by socioeconomic events, while volatility is accentuated mainly by political events (0.317150).

In general, results stipulate that political events have a negative effect on the performance and more particularly on the return of all our endogenous variables (at different degrees of significance); economic events affect negatively the performance of the exchange rate and the *Sectoral index of performance of Tunisian banks*. Social events and terrorism intervene in the evolution of the performance of the *Sectoral index of performance of Tunisian banks* and *TUNINDEX*. Volatility is fueled mainly by political and economic events, social and terrorism event increase solely volatility of stock market index *TUNINDEX*.



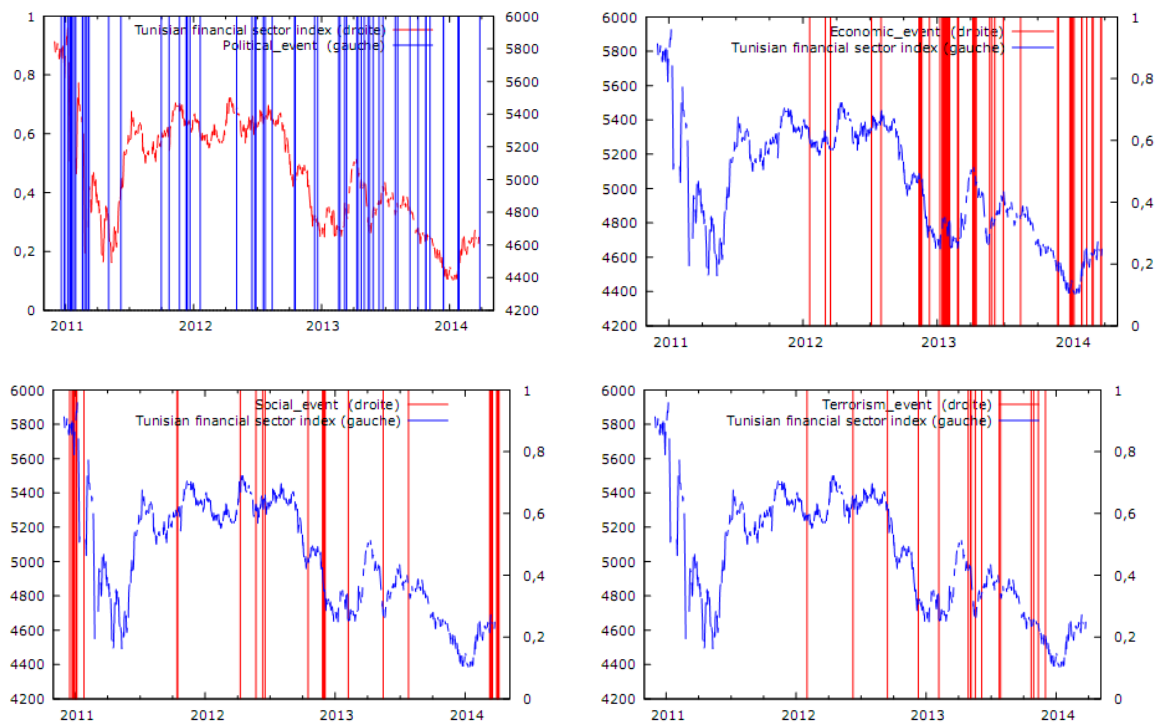


Fig. 08. Tunisian Financial Sector Index under specific news

## CONCLUSION

The financial market has not ceased to be increasingly sensitive, to news factors. In fact, the explanation of the evolution of financial variables, and their volatility dynamic refers to the vulnerability of financial investors to the events. Looked under the aegis of the analysis of events approach, this paper tried to contribute to these lined through an empirical investigation dealing with the impact of the effects of news, relating to the period of the *Tunisian revolution*, from 01/12/2010 to 06.04.2014, on the *Tunisian Financial Sector*, news encompassing social, economic, political and terrorism shocks. Using daily database, namely *TUNINDEX*, the exchange rate *EUR / TND*, through their performance, and the *Sectoral index of performance of Tunisian banks.*, based on the *ARCH and EGARCH* models highlighted that the financial sector is sensitive to all of these events there is a reduced level; effect determined in the mean equation, and increased volatility; effect determined through the volatility equation. The estimate of the effect of these events separately, highlighted the importance of political and economic factors in the development of the financial sector and the sensitivity of financial investors to terrorism events. It appears that outside of a stable political and social environment, expansionary economic measures can not provide their expected effects.

## REFERENCES

- [1] Badarınza C., and Margaritov E., 2011, "News and policy foresight in a macro-finance model of the US", WPS n°1313. Available on <http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1313.pdf>
- [2] Andersen, G., Bollerslev, T., Diebold, F., and Vega, C., 2003, "Micro Effects of Macro Announcements: Real-Time Price Discovery in Foreign Exchange", *American Economic Review*, 93. Available on line on <http://www.ssc.upenn.edu/~fdiebold/papers/paper46/temp-abdvnew.pdf>
- [3] Baumert T., Buesa M., and Lynch T., 2013, "The impact of terrorism on stock markets: The Boston bombing experience in comparison with previous terrorist events", *Cátedra de Economía del Terrorismo*. Available on [http://pendientedemigracion.ucm.es/info/cet/documentos%20trabajo/DT16CET\\_impact\\_terr\\_boston.pdf](http://pendientedemigracion.ucm.es/info/cet/documentos%20trabajo/DT16CET_impact_terr_boston.pdf)
- [4] Bittlingmayer G., 1992, "Stock returns, real activity and the trust question", *Journal of Finance*, 47(5), 1701-30. DOI: 10.1111/j.1540-6261.1992.tb04680.x
- [5] Bittlingmayer G., 1998, "Output, stock volatility, and political uncertainty in a natural experiment: Germany, 1880-1940", *Journal of Finance*, 53 (6), 2243-57. Available on <http://www.jstor.org/discover/10.2307/117468?uid=3739176&uid=2129&uid=2&uid=70&uid=4&sid=21103716846957>
- [6] Cutler, David M., James M. Poterba and Lawrence Summers, 1989, "What moves stock prices", *Journal of Portfolio Management*, 15: 4-11. Available on [http://www.nber.org/papers/w2538.pdf?new\\_window=1](http://www.nber.org/papers/w2538.pdf?new_window=1)
- [7] Dangol, 2008, "Unanticipated Political Events and Stock Returns: An Event Study", *Economic Review*, [http://www.nrb.org.np/ecorev/pdf/vol20\\_art7.pdf](http://www.nrb.org.np/ecorev/pdf/vol20_art7.pdf)



- [8] Engle, R.F., 1982, "Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation". *Econometrica* 50, 987-1007. Available on <http://links.jstor.org/sici?sici=00129682%28198207%2950%3A4%3C987%3AACHWEO%3E2.0.CO%3B2-3>
- [9] Fama E., 1990, "Stock returns, expected returns and real activity", *Journal of Finance*, 44 (4), 1089-1107. DOI: 10.1111/j.1540-6261.1990.tb02428.x.
- [10] French. K, and Roll. R, 1986, "Stock return variances : The arrival of information and the reaction of traders" *Journal of financial economics*, 17: 5-26. Available on <http://www.sciencedirect.com/science/article/B6VBX458WN9HH/2/44fd7882c954da27b9afcbdbbca674c6>
- [11] Geweke, and Pantula, 1986, "Modeling the persistence of conditional variance; a comment" *Econometric Review*, 5, pp. 57-61. DOI: 10.1016/S0304-4076(97)00009-2
- [12] Karolyi, A, and R. Martell, 2010, "Terrorism and the Stock Market", *International Review of Applied Finance Issues and Economics*, 2(2), pp. 285-314. Available on <http://www.humanriskolutions.com/sites/www.humanriskolutions.com/files/PDFs/TerrorismAndStockMarketPDF.pdf>
- [13] Kim H., and Mei J., 1994, "Political risk and the stock market: the case of Hong Kong", Working paper S-94-30, New York University, Salomon Center. Available on [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1299474](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1299474)
- [14] Koku PS., Akhigbe A., and Springer TM., 1997, "The financial impact of boycott and threat of boycott". *Journal of Business Research* 40, 15-20. Available on <http://www.people.fas.harvard.edu/~hiscox/Koku.pdf>
- [15] Neiderhoffer. V, 1971, "The Analysis of World Events and Stock Prices", *Journal of business*, 44: 193-219. Available on <http://links.jstor.org/sici?sici=00219398%28197104%2944%3A2%3C193%3ATAOWEA%3E2.0.CO%3B2-7&origin=repec>
- [16] Nelson, D B 1991, 'Conditional heteroskedasticity in asset returns: A new approach', *Econometrica* 59: 347-370. [http://www.samsi.info/sites/default/files/Nelson\\_1991.pdf](http://www.samsi.info/sites/default/files/Nelson_1991.pdf)
- [17] Nikkinen J., and Vähämaa S., 2010, "Terrorism and stock sentiment", *Financial Review* 45(2), 263-275. DOI: 10.1111/j.1540-6288.2010.00246.x
- [18] Roll R., 1988, "R<sup>2</sup>", *Journal of finance*, 43(3), 41-66. DOI: 10.1111/j.1540-6261.1988.tb04591.x.
- [19] Schumaker RP., and Chen H., 2009, "Textual Analysis of Stock Market Prediction Using Financial News Articles", University of Arizona USA. Available on <http://www.robschumaker.com/publications/ACM%20TOIS%20Textual%20Analysis%20of%20Stock%20Market%20Prediction%20Using%20Financial%20News%20Articles.pdf>
- [20] Schwert G. W., 1989, "Why does stock volatility change over time?", *Journal of Finance*, 44 (5), 1115-53. Available on <http://www.jstor.org/discover/10.2307/2328636?uid=3739176&uid=2129&uid=2&uid=70&uid=4&sid=21103716951297>
- [21] Schwert G. W., 1990, "Stock returns and real activity: A century of evidence", *Journal of Finance*, 45 (4), 1237-57. DOI: 10.1111/j.1540-6261.1990.tb02434.x.
- [22] Shiller R., 1980, "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?", NBER Working Paper No. 456. Available on [http://www.nber.org/papers/w0456.pdf?new\\_window=1](http://www.nber.org/papers/w0456.pdf?new_window=1)
- [23] Shiller R., 2003, "From efficient markets theory to behavioural finance", Cowles Foundation n°1055. Available on <http://www.econ.yale.edu/~shiller/pubs/p1055.pdf>
- [24] Smets F., and Wouters F., 2007, "Shocks and Frictions in US Business Cycles: A Bayesian DSGE Approach", *American Economic Review*, 97(3):586-666. Available on <http://www.nbb.be/doc/oc/repec/reswpp/wp109En.pdf>
- [25] Suleman, M, 2012, "Stock Market Reaction to Terrorist Attacks: Empirical Evidence from a Front Line State", *Australasian Accounting Business and Finance Journal*, 6(1), 97-110. Available on <http://ro.uow.edu.au/aabf/vol6/iss1/15>
- [26] Teo H S., Welch I., and Wazzan C P., 1999, "The Effect of Socially Activist Investment Policies on the Financial Markets: Evidence from the South African Boycott", *Journal of Business*, 72, no.1. Available on <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.15.3343&rep=rep1&type=pdf>



Appendix

Table.4 Global event effect

	DLNTDIX		DLNERDT		LNSF	
	Coefficient	Significance	Coefficient	Significance	Coefficient	Significance
$\phi_0$	-0.000221	0.2257	0.000104	0.1826	8.512483	0.0000
$\phi_1$	0.261701	0.0000	-0.230447	0.0000	1.044624	0.0000
$\phi_2$	-0.217765	0.0000	-0.068314	0.0120	-0.048869	0.0000
$\xi$	-0.633397	0.0000	-17.92514	0.0000	-0.241613	0.0000
$\alpha_1$	0.202310	0.0000	0.187637	0.0000	0.119521	0.0000
$\delta$	-0.111148	0.0000	-0.121111	0.0001	-0.049810	0.0000
$\beta$	0.955817	0.0000	-0.511193	0.0000	0.984561	0.0000
$\alpha_2$	0.201025	0.0000	0.414168	0.0006	0.068812	0.0000
R-squared	0.112789		0.046797		0.983712	
Adjusted R-squared	0.105610		0.037961		0.983561	
S.E. of regression	0.005430		0.002898		0.007316	
Sum squared resid	0.025509		0.007249		0.046245	
Log likelihood	3507.775		3879.652		3189.924	
Durbin-Watson stat	1.812964		1.989797		1.571557	
Mean dependent var	-0.000163		0.000101		8.546927	
S.D. dependent var	0.005742		0.002955		0.057061	
Akaike info criterion	-8.017812		-8.877642		-7.287340	
Schwarz criterion	-7.974083		-8.828402		-7.238144	
F-statistic	15.70941		5.296029		6522.689	
Prob(F-statistic)	0.000000		0.000002		0.000000	
Observation	1,223	1,223	1,223	1,223	1,223	1,223



**Table.5 Social event effect**

	DLNTDIX		DLNERDT		LNSF	
	Coefficient	Significance	Coefficient	Significance	Coefficient	Significance
$\phi_0$	-0.000237	0.1971	9.84E-05	0.2409	8.545802	0.0000
$\phi_1$	0.259677	0.0000	0.198165	0.0000	0.982311	0.0000
$\phi_2$	0.000940	0.4744	-0.000229	0.6867	-0.002407	0.0085
$\zeta$	-0.977170	0.0000	-9.173011	0.0000	-5.876567	0.0000
$\alpha_1$	0.252316	0.0000	0.211032	0.0000	0.543521	0.0000
$\delta$	-0.120772	0.0000	-0.101969	0.0011	-0.093237	0.0126
$\beta$	0.928273	0.0000	0.234270	0.1313	0.455094	0.0000
$\alpha_2$	0.165573	0.0004	0.185369	0.4110	-0.071604	0.6898
R-squared	0.127913		0.044681		0.984128	
Adjusted R-squared	0.114715		0.030224		0.983870	
S.E. of regression	0.005403		0.002909		0.007261	
Sum squared resid	0.025074		0.007268		0.045294	
Log likelihood	3518.934		3882.724		3187.929	
Durbin-Watson stat	1.789387		2.049771		1.630011	
Mean dependent var	-0.000163		0.000103		8.547066	
S.D. dependent var	0.005742		0.002954		0.057175	
Akaike info criterion	-8.029631		-8.863057		-7.260708	
Schwarz criterion	-7.953105		-8.786531		-7.178790	
F-statistic	9.691825		3.090490		3804.444	
Prob(F-statistic)	0.000000		0.000165		0.000000	
Observation	1,223	1,223	1,223	1,223	1,223	1,223



Table.6 Economic event effect

	DLNTDIX		DLNERDT		LNSF	
	Coefficient	Significance	Coefficient	Significance	Coefficient	Significance
$\phi_0$	-0.000237	0.1971	9.84E-05	0.2409	8.545802	0.0000
$\phi_1$	0.259677	0.0000	0.198165	0.0000	0.982311	0.0000
$\phi_2$	-9.60E-05	0.8668	-0.036097	0.0388	-0.002324	0.0004
$\delta$	-0.977170	0.0000	-9.173011	0.0000	-5.876567	0.0000
$\alpha_1$	0.252316	0.0000	0.211032	0.0000	0.543521	0.0000
$\delta$	-0.120772	0.0000	-0.101969	0.0011	-0.093237	0.0126
$\beta$	0.928273	0.0000	0.234270	0.1313	0.455094	0.0000
$\alpha_2$	0.025497	0.6539	0.272439	0.0592	-0.353239	0.0375
R-squared	0.127913		0.044681		0.984128	
Adjusted R-squared	0.114715		0.030224		0.983870	
S.E. of regression	0.005403		0.002909		0.007261	
Sum squared resid	0.025074		0.007268		0.045294	
Log likelihood	3518.934		3882.724		3187.929	
Durbin-Watson stat	1.789387		2.049771		1.630011	
Mean dependent var	-0.000163		0.000103		8.547066	
S.D. dependent var	0.005742		0.002954		0.057175	
Akaike info criterion	-8.029631		-8.863057		-7.260708	
Schwarz criterion	-7.953105		-8.786531		-7.178790	
F-statistic	9.691825		3.090490		3804.444	
Prob(F-statistic)	0.000000		0.000165		0.000000	
Observation	1,223	1,223	1,223	1,223	1,223	1,223



Table.7 Political event effect

	DLNTDIX		DLNERDT		LNSF	
	Coefficient	Significance	Coefficient	Significance	Coefficient	Significance
$\phi_0$	-0.000237	0.1971	9.84E-05	0.2409	8.545802	0.0000
$\phi_1$	0.259677	0.0000	0.198165	0.0000	0.982311	0.0000
$\phi_2$	-0.001617	0.0292	-0.080170	0.0594	-0.098317	0.0313
$\zeta$	-0.977170	0.0000	-9.173011	0.0000	-5.876567	0.0000
$\alpha_1$	0.252316	0.0000	0.211032	0.0000	0.543521	0.0000
$\delta$	-0.120772	0.0000	-0.101969	0.0011	-0.093237	0.0126
$\beta$	0.928273	0.0000	0.234270	0.1313	0.455094	0.0000
$\alpha_2$	0.411722	0.0000	0.560487	0.0029	0.317150	0.0022
R-squared	0.127913		0.044681		0.984128	
Adjusted R-squared	0.114715		0.030224		0.983870	
S.E. of regression	0.005403		0.002909		0.007261	
Sum squared resid	0.025074		0.007268		0.045294	
Log likelihood	3518.934		3882.724		3187.929	
Durbin-Watson stat	1.789387		2.049771		1.630011	
Mean dependent var	-0.000163		0.000103		8.547066	
S.D. dependent var	0.005742		0.002954		0.057175	
Akaike info criterion	-8.029631		-8.863057		-7.260708	
Schwarz criterion	-7.953105		-8.786531		-7.178790	
F-statistic	9.691825		3.090490		3804.444	
Prob(F-statistic)	0.000000		0.000165		0.000000	
Observation	1,223	1,223	1,223	1,223	1,223	1,223





Table.8 Terrorism event effect

	DLNTDIX		DLNERDT		LNSF	
	Coefficient	Significance	Coefficient	Significance	Coefficient	Significance
$\phi_0$	-0.000237	0.1971	9.84E-05	0.2409	8.545802	0.0000
$\phi_1$	0.259677	0.0000	0.198165	0.0000	0.982311	0.0000
$\phi_2$	-0.008253	0.0014	0.000324	0.8550	-0.001672	0.7562
$\zeta^2$	-0.977170	0.0000	-9.173011	0.0000	-5.876567	0.0000
$\alpha_1$	0.252316	0.0000	0.211032	0.0000	0.543521	0.0000
$\delta$	-0.120772	0.0000	-0.101969	0.0011	-0.093237	0.0126
$\beta$	0.928273	0.0000	0.234270	0.1313	0.455094	0.0000
$\alpha_2$	1.632819	0.0000	-0.800581	0.5659	0.653520	0.3140
R-squared	0.127913		0.044681		0.984128	
Adjusted R-squared	0.114715		0.030224		0.983870	
S.E. of regression	0.005403		0.002909		0.007261	
Sum squared resid	0.025074		0.007268		0.045294	
Log likelihood	3518.934		3882.724		3187.929	
Durbin-Watson stat	1.789387		2.049771		1.630011	
Mean dependent var	-0.000163		0.000103		8.547066	
S.D. dependent var	0.005742		0.002954		0.057175	
Akaike info criterion	-8.029631		-8.863057		-7.260708	
Schwarz criterion	-7.953105		-8.786531		-7.178790	
F-statistic	9.691825		3.090490		3804.444	
Prob(F-statistic)	0.000000		0.000165		0.000000	
Observation	1,223	1,223	1,223	1,223	1,223	1,223