The Impact of the political instability on Conventional Banks' stability: Evidence in Tunisia

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Abstract

Using the GARCH, E-GARCH models, this paper analyzes the financial stability of a sample of nine Tunisian commercial banks listed in Tunisian Stock Exchange market (BVMT) pre and post the Jasmine revolution, using the daily returns for the period from 02/01/2009 to 29/06/2012. To evaluate the effects of this recent political crisis, we disjointedly consider the pre-crisis period, 2009-2010, the post crisis period, 2011-2012, and the whole period. Before performing the empirical investigation a set of required tests were applied such as the normality, unit root and Heteroskedasticity tests. The results showed that the Tunisian banking system were more stable before the fall of Ben Ali regime, which may due to the strong links with the political stability. The study recommended that banking system in Tunisia need some reforms to diversify their risks and to improve transparency in according loans.

Keywords: *Conventional Banks, Financial Stability, BVMT, Jasmine revolution, GARCH Models.*

JEL Classification: *G210, G280*

Introduction

During the last decades, the financial systems particularly the banking one has played a great role in the improvement of the world economic growth. Banks were certainly the main factor of these economic developments. In fact, a stable banking system is the main ingredient for a successful and wealthy economy. In Tunisia, conventional banks started about five decades ago, during this period, banks have played a major role in financing and contributing to various economics and social sectors in the country. Reflecting their important position in the Tunisian's economy, the literature on banking system has grown, but while there has been a major events such as the Jasmine revolution which surely impacted the financial and economic activities, few researches into risk management, risk analyses and financial stability within conventional banks has been addressed from a theoretical and empirical viewpoint.

Since 2010 some Arab countries faced a political crisis described as the most important event in century every witnessed by the all sectors. The current Jasmine revolution as a major event since the independence is considered as an ongoing political crisis. This

national crisis reached its peak with the fail of Ben Ali's regime on January 2010 and spread to the rest of Arab spring countries (Libya, Egypt, Yemen and Syria). Many economists stated that it has until now many effects on economy and financial activity.

Uncertainty and instability are the major characteristics of today's spring Arab nations' economies. Since, economy health is strictly linked to the reliability and the transparence of its banking system, people should have more confidence on banks that performs in the best way. While, banks are the major players in economies, the object of this study is the analysis of effects of the last political crisis's on stability of banking system during and after the revolution. For this end, we choose the volatility of daily returns as a perfect assessment of the financial stability of selected banks (REF). In this paper we seek to answer the following two main questions: "*is there a statistical significant difference in financial stability between the pre and post the recent political crisis? And do conventional banks show actually a relative financial stability two years after the crisis?"*

The remainder of this article is structured as follows: firstly we set out the theoretical background and literature review to provide support for the issue under investigation. Secondly, data and methodology and finally, the results are presented.

Review Financial stability literature

The financial system is composed by three parts: financial intermediaries, like banks, insurance companies and other institutional investors, financial markets as money markets and stock exchanges, and other financial market infrastructures such as payment systems and security settlement systems through which lenders and borrowers meet. Given the interdependence and the complex interactions between these different elements among themselves and with the real economy, it's so difficult to define or to assess financial stability (Gadanecz and Jayaram, 2009; Goodhart, 2006).

Nevertheless some authors have tried to define this phenomenon; for example Schinasi (2004) defined the financial stability as follows: "*A financial system is in a range of stability whenever it is capable of facilitating (rather than impeding) the performance of an economy and of dissipating financial imbalances that arise endogenously or as a result of significant adverse and unanticipated events*". While, Foot (2003) assumes that the financial stability is conditioned by a monetary stability, abundance of job opportunities, confidence in the operation of the generality of key financial institutions and markets, no relative price movements of either real or financial assets that will undermine the monetary and employment stabilities. According to Crockett (1997), the financial stability occurs when there is a high degree of confidence that the key institutions continue to meet their contractual obligations without disturbance or outside interventions; and that the participants in key markets can confidently transact in them at prices not substantially variable over short periods and reflecting the fundamental forces.

In the other side, some others researchers have attempted to define the financial instability instead of financial stability. Allen and Geoffrey (2006) define periods of financial instability as episodes when large number of participants (households, companies or governments) subjected to financial crises not explained by their previous behavior. So financial stability can be defined as period when the occurrence of a crisis which can have seriously unfavorable macroeconomic effects is very low. One of the main effects of this crisis is the asset price volatility. Similarly Chant (2003) defined financial instability as period of dysfunction of the financial system which harm or threaten to harm the economy's performance. This dysfunction is explained by Davis (2001) as major collapse of the financial system inducing inability to afford payments services or to allocate credit to investors.

Unlike the authors' point of view aforementioned, Mishkin (1999) emphasized firstly the role of asymmetric information in occurring financial crises. He stated that "*financial instability occurs when shocks to the financial system interfere with information flow so that the financial system can no longer do its job of channeling funds to those with productive investment opportunities*".

Aside from the aforesaid plethora definitions, there is an agreement on basics despite the disagreement in giving a common definition of financial stability. In fact, the financial stability can be defined generally as a condition in which the financial system can resist to crisis and shocks, thereby diminishing the likelihood of sever disturbances in the financial intermediation process. Understood this definition, the safeguarding of financial stability which's essential for social and economic stability requires determining the main sources of risk and vulnerability like inefficient allocation of financial resources from savers to investors and the miss-pricing or mismanagement of financial risks.

Banking system stability

While banking efficiency and profitability has been the subject of huge number of published researches, little effort has been conducted to study the effects of political crises on banking stability. To our knowledge, this study is the first to investigate the impact of the last political crisis (Tunisian Jasmine revolution) on bank's stability. Furthermore, no econometric study has been undertaken to examine empirically the effects of political crisis to banking stability.

In this regard, Hesse and Cihák (2007) have treated the case of cooperative banks to investigate the financial stability using the z-score method. The most important finding of this investigation was that commercial banks were less stable than cooperative banks. While Cihák and Hesse in 2008 have provided a cross-country empirical analysis of the role of Islamic banks in financial stability after the subprime crisis. They founded in their study that Islamic banks were financially more stable and solid than conventional ones of the same size using regressions of z-score as a function of a number of variables.

Recently, Boumediene and Caby (2009) have study "*The Stability of Islamic Banks during the Subprime Crisis*". They investigated in this paper the stability of Islamic banks during the subprime crisis, and empirically analyzed the particular nature of their risks and vulnerabilities at the time of the well-known 2007 banking crisis. For this end, the researchers have used some of GARCH asymmetric models to observe the volatility of the Islamic banks' stock returns.

Data and methodology

The data used in this paper comprises a representative sample of banks operating in Tunisia and listed in the Tunisian Stock Exchange market (2012). The sample used to assess the stability of banks before and during the recent political crisis (Jasmine revolution) is consisting of nine conventional banks, over the periods of 02/01/2009 to 29/06/2012. This period involved the political crisis of 14/01/2011.

Throughout this article, we adopt the following notations:

$$R_t = \ln(\frac{P_t}{P_{t-1}})$$

Where, P_t and P_{t-1} are the daily closing prices of the stocks index at time t and t-1

The stability of banks is measured by the volatility of their returns as noted above and the volatility is assessed according to the Generalized Autoregressive Conditional

Heteroskedasticity model (GARCH). In this research we opted for the use of the symmetric GARCH model and examine the asymmetric reactions of the conditional mean and volatility by using the two models GARCH and E-GARCH models.

The ARCH model

Engle (1982) proposed a new class of autoregressive conditional heteroskedasticity (ARCH) able to capture the behavior of volatility over time. The principle proposed by Engle is to introduce a dynamic determination of the volatility assuming that the variance is conditional upon information available to us. In the ARCH model, the variance is a moving average of past error terms as follows:

$$h_t = \omega + \sum_t^p \alpha_t \varepsilon_{t-i}^2$$

Where ω and α are constant parameters, p is the order of the moving average ARCH terms.

The GARCH model

Bollerslev (1986) suggested the following natural generalization of the ARCH model by modeling conditional variance as a function of the residual and the volatility of past periods.
So, the GARCH (p, q) model specification is:

$$h = \omega + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^{q} \beta_j h_{t-j}$$

Where, $\varepsilon_t^2 \succ 0$, $\alpha_i, \beta_j \geq 0$ and $\sum_{i=1}^{p} \alpha_i + \sum_{j=1}^{q} \beta_j \prec 1$

Then the GARCH (1, 1) model can be summarized as follows:

$$h = \omega + \alpha \varepsilon_{t-1}^2 + \beta h_{t-1}$$

In the GARCH (1.1) model, the parameters ω is a term constant, $\varepsilon^2{}_{t-1}$ is the squared residuals from the mean equation and h_{t-1} is the ARCH term. Also, α shows the impact of current news on the conditional variance and β the persistence of volatility to a shock.

The Exponential GARCH (E-GARCH) Model

The Exponential GARCH model (EGARCH) was proposed by Nelson (1991). The specification for the conditional variance is:

$$\log(\sigma_t^2) = \omega + \sum_{j=1}^{q} \beta_j \log(\sigma_{t-j}^2) + \sum_{i=1}^{p} \alpha_i \left| \frac{\varepsilon_{t-i}}{\sigma_{t-i}} \right| + \sum_{k=1}^{r} \gamma_k \frac{\varepsilon_{t-k}}{\sigma_{t-k}}$$

The log of the conditional variance implies that the leverage effect is exponential, rather than quadratic, and that forecasts of the conditional variance are guaranteed to be nonnegative. The presence of leverage effects can be tested by the hypothesis that $\gamma_i \prec 0$. When returns (R) < 0, then positive shocks (good news) generate less volatility than negative shocks (bad news). When R > 0, it implies that positive innovations are more destabilizing than negative innovations (in this case bad news represents the financial crisis). The impact can be asymmetric when $\gamma_i \neq 0$.

Empirical Results

Descriptive Statistics

The results of descriptive statistics of returns series of the whole period, before and during political crisis are presented in the following table (1):

Table 1 Descriptive Statistics of Stock Returns

	All the period	Before the political crisis	During the political crisis
Mean	-0.000186	-0.000147	-0.000241
Std.dev	0.010903	0.006310	0.013190
Skewness	-15.66207	-14.98690	-0.374165
Kurtosis	366.7977	290.6280	5.604349
Jarque-Bera	4810989	1780585	108.6097

The return means before political crisis (-0.000147) exceeds the returns means during the political crisis (-0.000241). Also, the volatility of returns average before crisis (0.006310) is less than during crisis (0.013190). This means that the return during political crisis fluctuated more than the return before political crises.

We note that the value of the Jarque-Bera test for normality reject the null hypothesis of a normal distribution. The coefficients of kurtosis are greater than 3. The high value of kurtosis indicates that the null hypothesis for kurtosis coefficients that conform to the normal value of three is rejected. However, the asymmetry coefficients of Skewness are different from 0. This suggests that the returns series does not follow a normal distribution. Also, Elyasiani, Getmansky and Mansur (2010) argued that the negative skewness is an indication that extreme negative returns are more likely than sharp positive returns. This suggests a high level of risk for the investors.

Unit Root Test

The unit root test is used principally to verify if the data series is stationary e.g if its mean and variance are invariable over time and the value of the covariance between the two time periods depends only on the distance or lags between the two time periods (Gujarati and porter, 2010).

The Dickey-Fuller Augmented (DFA) test is performed to identify whether the time series of Tunisian banks' returns are stationary. The results reported in table (2) indicate that the null hypotheses concerning the non stationarity are rejected at 1% level. These mean that all returns series are considered to be stationary covering all the study periods which allows for applying the GARCH methods.

Table 2 Unit Root Test Results

	All the period	Before the political crisis	During the political crisis
Augmented Dickey-Fuller test statistic	-5.580973	-4.786318*	-10.88091
Probability	0.0000	0.0005	0.0000

*Significant at 1% level

Tests for the ARCH Effect

For testing the validation of GARCH models, Box Pierce, Ljung Box Q-test is performed to examine the autocorrelations and partial autocorrelations of the squared standardized residuals see Brooks (2001) and Franses and Ghijsels (1999). The test is made on the squared standardized residuals with 15 lag to test for remaining ARCH in the variance equation, and to check the specification of the variance equation. If the variance equation is correctly specified, all Q-statistics should not be significant. The result is reported in table (3).

Table 3 Tests for the ARCH Effect

	Before the political crisis		During the political crisis	
	GARCH	EGARCH	GARCH	EGARCH
Q(15)	6.496 (0.970)	15.557 (0.412)	11.855 (0.690)	12.259 (0.695)
$Q^2(15)$	0.058 (1.000)	0.142 (1.000)	21.756 (0.114)	18.595 (0.233)
Arch-LM (15)	0.0037 (1.000)	0.008 (1.000)	1.420 (0.135)	1.197 (0.271)

The analysis of Ljung-Box statistics test for the squared and standardized residuals indicates a correlogram whose terms are significantly different from zero, then an ARCH specification is to retain. The LM test for the presence of ARCH effects at 15 lags indicates that the conditional heteroskedasticity existed.

Estimation of GARCH and E-GARCH parameters

GARCH (1, 1) before the political crisis

$$h_t = 0.000131 - 0.004107\,\varepsilon_{t-1}^2 + 0.526610\,h_{t-1}$$
$$(0.61319)\quad(-1.61112)\quad(0.68072)$$

Log likelihood=1465.993

E-GARCH (1, 1) before the political crisis

$$\log h_t = -3.194337 - 0.558743\left|\frac{\varepsilon_{t-1}}{\delta_{t-1}}\right| + 0.24463\,\frac{\varepsilon_{t-1}}{\delta_{t-1}} + 0.612332\log(h_{t-1})$$
$$(-4.89706)^*\quad(-8.08484)^*\quad(5.41135)^*\quad(8.02134)^*$$

Log likelihood=1562.313

GARCH (1, 1) during the political crisis

$$h_t = 1.28E^{-06} + 0.068325\,\varepsilon_{t-1}^2 + 0.891067\,h_{t-1}$$
$$(1.82698)^{***}\quad(2.545687)^{**}\quad(22.47045)^*$$

Log likelihood=1316.915

E-GARCH (1, 1) during the political crisis

$$\log h_t = -0.586156 + 0.172271\left|\frac{\varepsilon_{t-1}}{\delta_{t-1}}\right| - 0.066624\,\frac{\varepsilon_{t-1}}{\delta_{t-1}} + 0.956348\log(h_{t-1})$$
$$(-3.06325)^*\quad(2.791272)^*\quad(-2.149063)^{**}\quad(56.40999)^*$$

Log likelihood=1319.914

The estimation results before crisis show that E-GARCH model presents a highest log likelihood value than the GARCH model, which means that it provides a better explanation of volatility. Before the political crisis, the parameters of E-GARCH model are all significant at 1%. The coefficient γ is positive and significant, which prove that there was no leverage effect before the political crisis. Besides, this proves that the bad news (political crisis) has no effect on the volatility. While the results during the political crisis show that E-GARCH model is better than GARCH model to explain the volatility. The coefficients of the model E-GARCH are all significant at a threshold of 5%. The parameter γ is negative, which proves that the political crisis increases the volatility and there was a leverage effect during the crisis.

Estimates of Conditional Variances

The results in table (4) show that the volatility during the crisis (0.119) is higher than the volatility before crisis (0.005). Also, the standard-deviation is higher (1.021) than before crisis (0.004). This indicates that the investors in Tunisia haven't any confidence in the banks during the Jasmine revolution. These findings show that the political crisis has an impact on the volatility and stability of banks.

Before the crisis, the results show that Skewness is positive, which indicates that the distribution is skewed to the left relative to its mean with long right tails. However, during the crisis skewness value is negative which indicates that the distribution's lower tail is thicker with a long left tail. For Elyasiani et al. (2010) the negative skewness is an indication that extreme negative returns are more likely than sharp positive returns. This suggests a high level of risk for the investors. The kurtosis is higher than before and during the crisis. This indicates the uniformity of the distributions with a longer and fat tails than a normal distribution (the distributions are leptokurtic).

Table 4 Statistical Estimates of Conditional Variances

	Mean	**Std.dev**	min	max	**Skewness**	**Kurtosis**
Before crisis	0.005	1.004	-4.20	3.80	0.16	4.20
During crisis	0.119	1.021	-17.59	3.22	-10.45	179.324

Plots of the volatility for the banks before and during crisis are presented in the following figures. Values in the vertical axis show clearly the difference in volatility levels before and during political crisis. This shows that the volatility is higher during crisis.

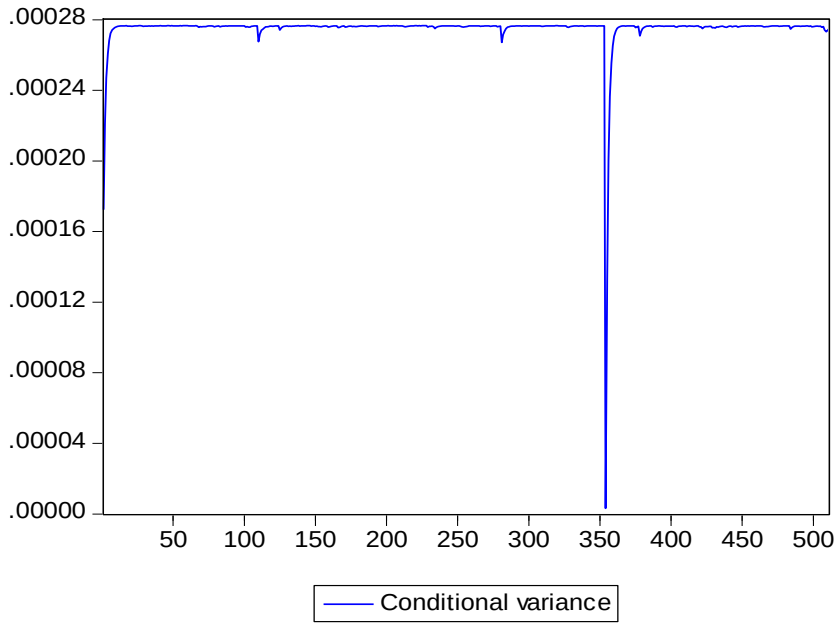

Figure 1: Before the political crisis

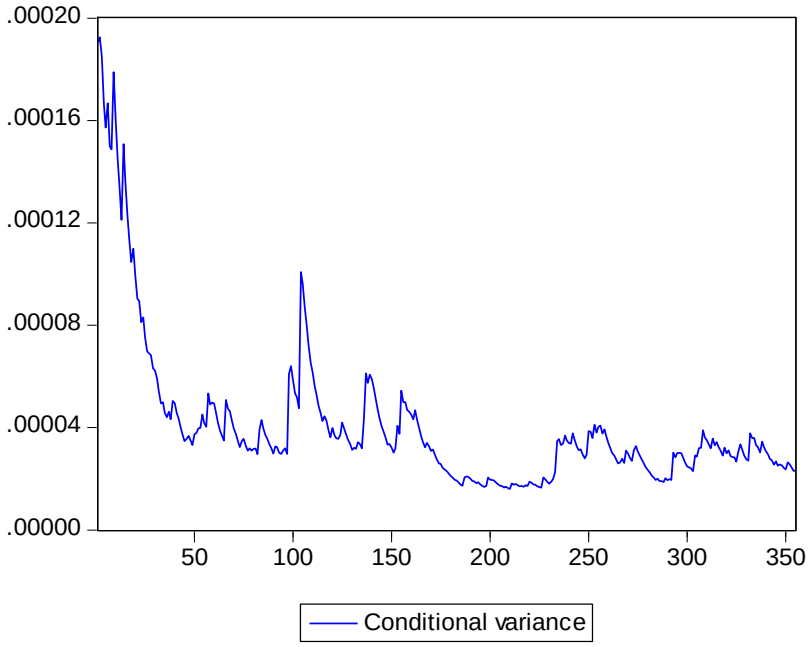

Figure 2: During the political crisis

The conclusion can draw that the banking system is more stable before political crisis in Tunisia than during crisis. The negative impact of the political crisis is observable and reflected in the no confidence of investors.

Conclusions

This paper investigates the effects of the last political crisis (Jasmine revolution) on financial markets particularly on banking system by testing and comparing the stability of some conventional banks pre and post the fall of the Ban Ali's regime. Tunisia experienced major domestic political crisis which's the Jasmine revolution and therefore makes it a very interesting choice for such an investigation. The paper first introduces with a short literature review on financial stability and banking. Then the methodology and data used is described shortly. Finally, an empirical estimation based on GARCH models is performed to determine the impact of the revolution on the Banking stability.

The empirical evidence and results show that the banking system is more stable before 14 January than during and pre political crisis. The negative impact of such major event is observable and clear and has important policy implications. The main reason of such negative impact is principally the anxiety and no confidence of investors due to the political instability. Then, the new policy makers need to address the main causes of the last revolution and try to mitigate its negative effects on the design and implementation of economic policies.

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