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BEHAVIOURAL DECISIONS AND THE RISK OF THE TUNISIAN FINANCIAL MARKET: WHAT ARE THE CAUSAL CONNECTIONS?

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Abstract

The purpose of this paper is to study the Tunisian financial market sensitivity to the behaviour of speculators. Over the period from 1999-2011, we show the relationships between market risk, the behaviour of speculators and financial prediction. By econometric modelling (unit root test and the tests of Granger causality), we establish causal links between these variables and their impact in the formulation of financial bubbles. We conclude with a schematic overview describing the sensitivity of the financial market studied.
Keywords—Bubbles, behaviour, financial risk
JEL Codes— G00, G01, G20, K0.

I. INTRODUCTION

To support this research, literature has been consulted on historical and recent bubbles, theories surrounding speculation, the market for venture capital, and bubbles in the technology sector. By analysing a range of bubbles, rather than just those in the technology sector, general bubble-principles are also identified. All the economic bubbles are classified under "uncontrolled risk" and a recommended method that can detect and analyse full impacts by uncontrolled risk will be presented, together with future directions to be discussed.

The financial crisis in 2008 and 2009 period has resulted in economic downturns in many countries with high unemployment rates and economic bubbles at national and international levels. Causes included a lack of governance, easy and uncontrolled mortgage lending, speculation of the financial market and finally inappropriate use of irrelevant models for speculation resulting in evaporation of "hot-money" (Hamnett, 2009; MacKenzie & Spears, 2014, [7]; Chang 2014, [20]). This motivates us to investigate all economic bubbles to understand the causes, ways to minimise their impacts and any correlation between bubbles.

An economic "bubble" is defined as a period in which speculative investment leads to an overvaluation of secure within a particular sector (Siegel, 2003, [22]). Economic bubbles may

«burst" when investors realise that the industry within the bubble is not as profitable or sustainable as they first thought. At this point, valuations of the companies and securities involved descend rapidly to pre-bubble levels. Many bubbles are only categorised as such after they have "burst". Scientifically defining the term "bubble" is a subject of some debate, particularly bubbles which have yet to collapse (O'Hara, 2008, [23]).

This studies starts with a review of historic bubbles crashs. Our objective is to discuss the principal governance issues as they relate to the bubbles phenomenon, drawing on relevant literature. Then we will choice a suitable model to analyse "uncontrolled risk" and the overall factor that causes economic bubbles.

Some bubbles are easier to detect than others, as for instance with stock market bubbles, because traditional valuation metrics can be used to identify extreme overvaluation. Other bubbles are harder to detect, and may only be identified in hindsight. So, we list below five of the biggest bubbles occurred during the last 400 years and hold valuable lessons that should be heeded by all investors.

II. LITERATURE REVIEW

Taking as our starting point that the strong-form EMH does not always hold, we assume that bubbles can occur from time to time in asset markets. In the literature, as e.g. in Charles Kindleberger's (2000) book, Peter Garber's (1990) article, and Didier Sornette's (2003) book, at least two of the three fascinating chains of stock market events are always mentioned under the heading 'stock market bubbles'. These three historical events are Tulipmania, Mississippi bubble and South Sea Bubble.
These three episodes entail some common features that have been linked to the classical bubble concept, the most important being extreme price appreciation. This is the necessary, but not the only sufficient characteristic of a bubble. The three periods have also been cited as good examples of pure speculative price appreciation without any reasonable economic foundation. This is another necessary symptom of a bubble: prices should become detached from their fundamentally justifiable levels.
Researchers apply different/several statistic and econometric methods to asset price growth to identify the best model to discover the existence of a bubble. They usually test models for all asset price bubbles to verify (or control) they are transverse.

This paper tries to analyze this idea on the causes of bubbles on Tunisian financial Market. We regress on several variables identified in literature as causes of bubbles.

III. WHY IS BUBBLE IDENTIFICATION IMPORTANT?

The importance of tracking bubbles in asset prices is due to the relationship between asset prices and overall functioning of the financial system and the overall performance of the economy. As commonly agreed, central banks have traditionally had two primary tasks: to promote a healthy economy and price stability, and to promote the stability of the financial system. Recent addition to this list is the task to promote (in co-ordination with national regulators) macro stability in the economy, where the core aim is to minimize economy's output losses through prevention of emergence of financial crises (e.g. Borio, 2010, and Melolinna and Vauhkonen, 2011). These core tasks indicate the causes why regulators and

central banks should pay attention to asset price developments and to possible formation of bubbles.

IV. METHODOLOGY SPECIFICATION

We specify the model, the sources of the data and our methodological approach and we analyze the stationarity of the series to be able to determine the level of integration of variables. It is a question of identifying the explained variable and the explanatory variables of the model, the signs of the parameters and the equation of the model.

To detect the phenomenon of financial bubbles we built measurement model in which the independent variable is the market risk value and the independent variables that are expected to determine this risk are « the speculators behaviour index» and « the expected value index ». There are carefully chosen, based on previous literature and availability of dataset for the selected period.

We propose an estimation model as follows in Equation 1, where the selected variables are expected to determine the appearance of bubbles:

□□□□□□□□α□□□β□□□□□□□□θ□□□□□□□□□□□□□□ □□□

α is a constant, β and θ are the coefficients relative to every variable and ε_i is the term of error.

The "Market Risk (MR)", measures the risk of loss that may result from fluctuations in prices of financial instruments of a portfolio. The risk may relate to stock prices, interest rates, exchange rates, commodity prices, etc.

The « speculator behaviour index (SBI) » is usually measured with a market pressure indicator, the latter introduced by (Eichengreen B, Rose A. & Wyplosz Ch, 1996, [4]) is defined as a weighted sum of changes the nominal exchange rate t_n, changes in the interest rate t_i and r reserves. Moreover, we can also define currency crises by unusually high variations in terms of monetary history. Frankel J. A. and (Rose A. K, 1996) define the crisis through a depreciation of at least 25% of the nominal exchange rate that is at least 10% higher than the previous year .

The expected value index is measured with the Price Earnings Ratio which judge the deviation of the price compared to their fundamental value. (Campbell and Shiller, 2001, [13]) showed that PER helps predict future changes in stock prices. The PER can also reveal the speculation of investors who anticipate strong growth in future profits. It is calculated by dividing market capitalization by CB net income (RN), or by dividing the stock price by earnings per share.

V. DATA AND RESULTS

The data cover the period 1999-2011 obtained from data "Economic freedom" from "Global Economy" and "world bank". The variables are in real terms. These variables can explain the situation of countries in difficulty. Our study is a forecast of bubbles in the stock market (as in Tunisia). It connects three imbalances indicators such as the market risk, the behaviour index and the expecting value index.

Thus, econometric methodology includes four steps. The first is a study of stationarity of the series which determines their order of integration. The second phase is to tests the existence

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of cointegrating relationship between the variables. The third step is to estimate the model parameters. Finally the fourth and final step is a causality test. Before beginning, we try to identify the explanatory and descriptive analysis of the evolution of financial bubbles and its determinants on the Tunisian stock market. The endogenous variable is the annual rate of the market risk of the country in the period 1999-2011. The exogenous variables are the SBI and EVI. The testing of stationarity shows that all the variables are still in the first difference and they are significant.

The model is globally significant and can be used for the forecast. The results are in the following TABLE 1.

TABLE I. THE MODEL SPECIFICATION

Dependent Variable: MARKET RISK				
Method: Least Squares				
Sample: 1999 2011				
Included observations: 13				
Variable	**coefficient**	**Std.Error**	**t-Statistic**	**Prob.**
SPECULATOR BEHAVIOR INDEX	-1.534387	1.321716	-1.160905	**0.2726**
EXPECTED VALUE INDEX	0.539599	0.672243	0.802684	**0.4408**
C	32.68044	2.147672	15.21668	**0.0000**
R-squared		0.184341	**Mean dependent var**	32.91573
Adjusted R-squared		0.021210	**S.D. dependent var**	1.902777
S.E. of regression		1.882491	**Akaike info criterion**	4.302243
Sum squared resid		35.43771	**Schwarz criterion**	4.432616
Log likelihood		-24.96458	**Hannan-Quinn criter.**	4.275445
F-statistic		1.130015	**Durbin-Watson stat**	0.695932
Prob(F-statistic)		0.361029		

a. *Source: the Author from the data of the model.*

VI. NORMALITY TEST

This test of normality in a given data sample of a country is considered an effective way of determining whether the distribution of data in a sample departs from a normal distribution. In the fig 1 the probability given by normal test (0.715) is higher than 5% we accept the hypothesis of the normality.

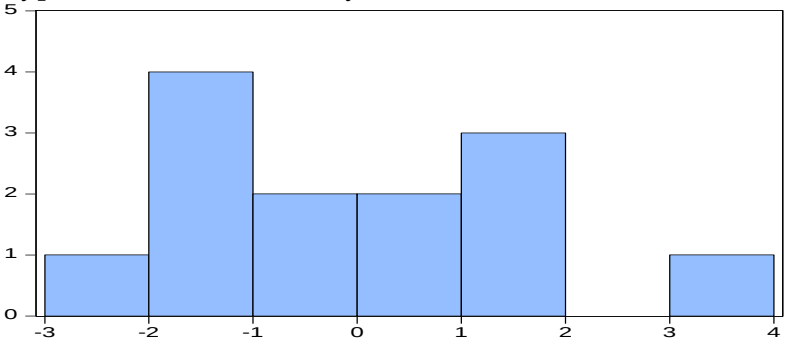

Fig. 1. Test of Normality of data sample

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Test of stationarity of the series

A stationary time series means that the variable distribution does not vary in time. In fact the source of non stationarity is often the presence of unit root and to test for the unit root, the test is applied Dickey-Fuller (ADF) after ensuring that the series is not perfectly autocorrelated.

We shall adopt the econometric approach by opting for the use of the granger causality test. It permit to define and to show the existence or not of causality between the market risk and the exchange risk and between the market risk and the price earnings ratios. Also, we conduct several tests in order to define a model which has a predictive effect of the causality. The variables are retained, and the same period of study. By the test of stationarity of Dickey Fuller (ADF), we show the stationarity of the used series.

In our case all the used variables are still in first difference and all the variables are integrated by the same order. So that and according to the results of the test of Unitarian root of Dickey-Fuller Augmente (ADF), we shall make the test of causality of Granger.

All variables are stationer (t statistics higher than critical value or p lower than 5%).

TABLE II. THE RESULT OF STATIONNARITY AND INTEGRATION TEST

Variables	Stationnarity Yes/ No (at the threshol of 5%)	Order of integration	Dickey-Fuller (ADF) Value of the statistics	Critical value (at the threshold of 5%)	Prob. **
MARKET RISK	Yes	I (1)	-4.670304	-3.081002	0.0027
SPECULATOR BEHAVIOR INDEX (SBI)	Yes	I (1)	-3.753631	-3.081002	0.0146
EXPECTED VALUE INDEX (EVI)	Yes	I (1)	-7.844874	-3.065585	0.0000

b. *Source: the Author from the data of the model.*

Test of causality

TABLE III. PAIRWISE GRANGER CAUSALITY TESTS

Sample: 1999 2011			
Lags: 4			
Null Hypothesis:	**Obs**	**F-Statistic**	**Prob**
SPECULATOR BEHAVIOR INDEX does not Granger Cause MARKET RISK	14	1.98035	0.2359
MARKET RISK does not Granger Cause SPECULATOR BEHAVIOR INDEX		35.1228	0.0007
EXPECTED VALUE INDEX does not Granger Cause MARKET RISK	14	0.51970	0.7271
MARKET RISK does not Granger Cause EXPECTED VALUE INDEX		0. 17020	0.8932
EXPECTED VALUE RISK does not Granger Cause SPECULATOR BEHAVIOR INDEX	14	0.62710	0.6641
SPECULATOR BEHAVIOR INDEX does not Granger Cause EXPECTED VALUE INDEX		21.798	0.0094

c. *Source: the Author from the data of the model.*

From the results, all variables relative to these causalities are cointegrated at the threshold of 5%. According to the result of the Granger test, the p value (0.0007) is lower than 5%. So that, in short or long term the market risk causes the Speculator Behaviour Index. And this latter causes the Expected Value Index (0.0094 is lower than 5%).

The stationary test showed that these variables are stationary in first difference and they are quite significant, hence we note the predictive effect of the model used for this estimate. From there we can confirm that the risk of Tunisia's market causes an acceleration of the share price during the period 1999-2011 and an increase in market pressure indicator for the same period.

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Thus, the prediction of advance information on market risk allows the preparation of the action plan of the Tunisian State. It guides him in which direction it must maintain the relative change in both nominal exchange rate to the market and therefore the pressure indicator and the price earnings ratio. This prevents accumulation of financial bubbles. In fact a financial crisis is usually caused by high variation in the exchange rate. There is a unidirectional causality between market risk and the EPM, which confirms the interaction between the real economy and the financial sphere.

Fig. 2. Causal connection between all variables

VII. CONCLUSION

The objective of our paper is to study the impact of governance on the financial market which is measured by the market risk of Tunisia over the period of 1999-2011. This article attempted to analyze the relations of causality between market risks, Speculator Behaviour Index the Expected Value. Through the tests of stationary and the test of causality of Granger, the results showed that: We found that the series of these three variables are stationary in first difference.

According to this result and based on Granger causality, we found two types of relationship between these variables: the first one is the relation of causality of risk market to speculator behaviour. The second one presents that the Speculator Behaviour Index affect the value expected (financial prediction). So we can conclude that most of crises are affected from the decision maker in financial Market and the degree of market risks. This risk is amplified especially after the financial liberalization.

REFERENCES

- Ari & R.Dagtekin, (2007), « les indicateurs D'alerte de la crise financière de 2000-2001 en Turquie : un modèle de prévision de crise jumelle », *Région et Développement n° 26-2007,* Conférence Internationale d'Economie D'Ankara, Turkish Economic Association, 11-13 septembre 2006.
- A.Atkeson, P. Kehoe (2001), « The Advantage of Transparent Instruments of Monetary Policy? », NBER Working Paper, n° 8681, décembre.

- A.M Robert Taylor, (2015), « Tests for Explosive Financial Bubbles in the Presence of Non-stationary Volatility », Journal of Empirical Finance, EMPFIN 834.
- Eichengreen, A. Rose & Ch Wyplosz, (1996), "Exchange Market Mayhem: The Antecedents and Aftermath of Speculative Attacks," Economic Policy 21, pp.249-312.
- B.Bernanke & M Gertler, (2001), « Should Central Banks Respond to Movements in Asset Prices? », *American Economic Review*, May.
- Hamnett, (2009), « The madness of mortgage lenders: Housing finance and the financial crisis ». London, UK: King's College.
- MacKenzie & T. Spears (2014), ' »The Formula That Killed Wall Street'? The Gaussian Copula and the Material Cultures of Modelling ». Working Paper.
- Mourey, (2009), « Démocratie, Economie et Société », Livre d'économie, Rapport moral sur l'argent dans le monde, AEF, Association d'Economie financière.
- Bekaert, C.R Harvey & A. Ng (2005), "Market Integration and Contagion", the Journal of Business 78, pp. 39–69.
- Kaminsky & S. L. Schmukler, (2003), "Short-Run Pain, Long –Run Gain: The Effects of Financial Liberalization", IMF Working Paper WP/ 03/34, Washington, DC, pp 1-60.
- Gomez Gonzalez José E. and al. (2013), « Testing for Bubbles in Housing Markets: New Results Using a New Method », Borradores de ECONOMIA, Num 753.
- J.F.Lepetit, (2010), « Rapport sur le risque systémique », ministère de finance, République Française, avril 2010.
- J.Y. Campbell and R.J. Shiller, (2001), "Valuation Ratios and the Long-Run Stock Market Outlook: An Update », The Review of Financial Studies 21(4): 1509-1531.
- K. Taipalus, (2012), « Detecting asset price bubbles with time-series methods », scientific monographs E 47.
- P. Diev et C. Pouvelle, (2008), « Stabilité financière dans les nouveaux États membres et les pays candidats à l'UE », Débats économiques, n° 4, Banque de France, janvier.
- Rapport du Conseil Economique, Social et Environnemental (2009), « La crise bancaire et la régulation financière», publié en 2009.
- T. Bettendorf & W. Chenb, (2013), « Are there bubbles in the Sterling-dollar exchange rate? New evidence from sequential ADF tests », Economics Letters, 120, pp. 350–353.
- T. Engsted, (2006), « Explosive bubbles in the cointegrated VAR model », Finance Research Letters 3, pp.154–162.
- T. Komulainen & J. Lukkarila, (2003), "What drives financial crises in emerging markets?" Emerging Markets Review, [19]. Volume 4, Issue 3, September 2003, Pages 248-272.
- V. Chang (2014), « The business intelligence as a service in the cloud. Future Generation Computer Systems », 37, 512-534.
- V. Mikhed & P. Zemčík (2007), « Testing for Bubbles in Housing Markets: A Panel Data Approach », Working Paper Series 338, (ISSN 1211-3298), CERGE-EI Prague, October 2007.
- J. Siegel, Jeremy, (2003), "What Is An Asset Price Bubble? An Operational Definition." European Financial Management 9.1 (2003): 11-24.
- M. O'Hara, (2008), "Bubbles: Some Perspectives (and Loose Talk) from History." Review of Financial Studies 21(2008):11-17.