International Journal of Business and Management Review
Vol.2, No.2, pp.73-90, June 2014
Published by European Centre for Research Training and Development UK(www.ea-journals.og)

STUDY OF THE DEGREE OF PERSISTENCE SHOCK'S ON THE VARIANCE AND THE DEGREE OF CONFIDENCE GIVEN BY THE INVESTORS TO THE DERIVATIVE PRODUCTS

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ABSTRACT: *We will study in our work, the persistence of the beneficial effect of the derivatives on the volatility and the efficiency of the French market. We will refer to the long term memory of FIGARCH type process as well as the breaking down of the anticipated variance of the volatility of the French stock market and the functions of impulse responses of different shocks of the derivatives. We deduced that the volatility is resistant in the market. We also noticed that the beneficial effect of these products is direct. This volatility disappears with the time because the impulse responses of these shocks are low and remaining inside the intervals of confidence and converging asymptotically towards the axis of abscissa. We will reveal in long term that the raise of volumes of transactions that is due to the concentration of the activities of investors on the derivative market is generating a big risk of volatilities in the French financial market. So, and despite the direct beneficial effects of these products on the volatility and the efficiency of the French financial market, it is become clear for the investors to reduce the total confidence granted on the increased use of these products which can lead in long term to the instability situations and of the persistence of the volatility in the financial markets.*

KEYWORDS: *Impulse responses, volumes of transactions, intervals of confidence, derivatives, persistence of volatility, transmissions of the chocks, VAR – FIGARCH*

INTRODUCTION

In our previous works, Ayadi (2012-2013) we have deduced the importance of the derivatives for a better flexibility of prices in the spot market through an Error correction model (ECM) and through links of causalities and relations of dependence between the variability of courses in the spot market and the different variables of future contract, and of options. We noticed that the derivative markets are tightly linked to the spot markets. There is also a strong link of causality between the variability of courses of the underlying and the volumes of transactions in the spot market. The dominance of coverage operations assumes that the elevated volatility in the underlying markets incites the investors to cover their positions with the help of the derivatives. These investors speculate more on the options which offer more gains and more security, rather than on the underlying assets. The dominance of coverage operations provides reliable information in the future volatility of the spot market and the effects of the volumes of transactions of the derivatives on the adjusted courses of the CAC40 index are very important. According to Gweeke Meese and Dent (1982), these products cause the advanced explanation

ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)

of the adjusted prices variability; they have an impacted positively on the variability of spot market by bringing relatively its stability. Consequently, they constitute an efficient signal of the variability of the spot market. However and taking into consideration the advantages given by these products to their users, it is question of discovering if the preferences of investors for these products can be absolute and can guarantee forever the stability of the financial market.

Our works bearing on the beneficial effect of the derivative products on the volatility of the French financial market have suggested through the Error Correction Model (ECM) of Engel and Granger (1987) a direct positive impact of these products on the stability of the financial market, Ayadi (2012). However, a measure of the persistence of the volatility following the introduction of the derivative markets permit to assess the spread of the effect of these products and to test its persistence. The traditional Garch and IGarch models used in the modeling of the financial sense of high frequency are incapable of identifying the behavior of persistence in the time. These models imply a persistence of shocks of volatility respectively low and infinite. However, the Figarch model fractionally integrated Garch has recently been introduced by Baillie Bollerslev and Mikkelsen (1996) and Baillie and Al (1996), it provides a direct measure of the persistence through a parameter of fractional integration.

The purpose of this article is to evaluate the persistence of the volatility in the French financial market following the introduction of derivative products (future contract and options) by a process of long memory of Figarch type. Consequently we use in the context of the persistence of shocks on the variance, the functions of impulse responses and the breaking down of variances of errors of anticipation within a VAR structural , to study the persistence in long term of the volatility of the CAC40 index after the introduction of the derivative products. We refer to functions of reactions (functions of impulsions and the breaking down of risks of variability) for every element of the derivative products in order to detect the most elevated part of components of our model of basis that permits to assist and in the long term the variability of the CAC40 index following the introduction of the derivative products.

VOLATILITY AND FIGARCH PROCESS:

The degree of persistence of shocks on the variance is an essential part for the speculators in the derivative markets. These latters will be incited to pay high prices for the products of long duration and this, if they perceive that the shock is sufficiently permanent relatively with the life of these products. The persistence to a high level of the volatility means that the variations of prices of actives are not suddenly interrupted after the arrival of new information but tends to persist. The phenomena of long memories have important implications in the theory of efficiency of financial markets because they allow to explain the possibilities of durable disconnections of courses to their fundamentals and to take into account the adjustment of prices to the new information. This process was modeled by the specification IGARCH (integrated volatility) of Engel and Bollerslev (1986) and Figarch (fractional volatility) of Engle and Bollerslev (1986) and Mikkelsen (1996). We identify the phenomena of long memory and we are interested to the depiction of the behavior of long term of the conditional variance of series of returns noted that the traditional process of GARCH type are adopted to a short memory process and they are consequently incapable of identifying the behaviors of the volatility in the time.

The use of Garch or IGarch process assumes an exponential decrease of the function of auto correlation of the conditional variance and a function of partial autocorrelation that was

ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)

annulated since the first lags. They cannot therefore take into account the phenomena of persistence of volatility shocks. Several studies, namely those of Baillie, Bollerslev and Mikkelson (1996), Baillie (1996), Ding and Granger (1996), and Mikrosh Starica (2000) Zaffarouni (2000), Chung-Ching Fan (2001) Corporin (2002), Corporin (2003) have validated and have proved that the autocorrelations decrease very slowly and the partial autocorrelations are significantly different from zero for very high delays, which leads us to assume the existence of a long memory in the process determining the volatility, knowing that the long-term dynamic is identified by the process of fractional integration.

They are processes which are integrated in the variance. However, we assume that the common use of models GARCH and IGARGH in the modeling of financial profitability expresses the dependence in a long term in the process of the conditional volatility. It also assumes the persistence of shocks of volatility through a FIGARCH process. It is a model constituting an intermediate case between Garch and IGarch that allows us to measure the persistence through a parameter of fractional integration. Thus we try to identify the behavior of volatility persistence through a process of long memory of FIGARCH type. This process links the notions of long memory with the volatility. The structure of long memory permits to do the anticipations of long memory of the volatility. Consequently, we can admit that the consent of this process lead to the assumption of the efficiency of financial markets because it will be possible to expect the future volatility of prices of assets.

The IGARCH model

The IGARCH model of Engel and Bollersllev (1986) or (integrated Autoregressive Conditional Hetreoscedasticity model) is a nonlinear ARCH model characterized by an effect of persistence in the variance and for which the contemporary shocks indefinitely persist in the future of conditional variances.It is a shock in the actual conditional variance that influences all the future values regardless of the behavior of average return. The contemporary shocks indefinitely persist in the futur conditional variances, when a shock occurs on the conditional variance; it affects estimates of all future values. However, it should be noted that the achievement of high degrees of persistence may be caused by incorrect specification of the conditional variance.

This model looks such as:

$$y_t = z_t \sqrt{h_t}$$

$$\varepsilon_t = z_t \sqrt{h_t}$$

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

With z_t homoscedastic low white noise with $E(Z_t)=0$ $\mathrm{VAR}(Z_T)=1$.

The parameters α_0 and α_i are actual values.

ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)

$$\sum_{i=1}^{q}\alpha_i+\sum_{i=1}^{p}(1-\alpha)_i=1$$

h_t : denotes the conditional variance of the process, such as $V(y_t/y_{t-1})=V(\varepsilon_t/\varepsilon_{t-1})=h_t$

Or y_{t-1}; designates the set = Past values $\{y_{t-1},.......y_0\}$

The anticipations of the variance in the different horizons are the following :

$$E(h_{t+k}/\varepsilon_t)=(\alpha_1+\beta_1)^k h_t+\alpha_0\sum_{i=0}^{k=1}(\alpha_1+\beta_1)^t$$

When $\alpha_1+\beta_1\langle 1$, the process ε_t is stationary and the influence of a shock on the conditional variance is decreasing on h_{t+k}, in this case we have $\beta_1\neq(1-\alpha_1)$

When $\alpha_1+\beta_1$=1 with β_1= (1- α_1)

We have $E\ (b_{t+k}/\varepsilon_t)=b_t+\alpha_0 k$

In the presence of a constant term $E(\beta_{t+k}/\varepsilon_t)$, diverges to k, implying the persistence of past shocks.

These models enable to the conditional variance to vary in the different period of sub sample getting low levels of persistence, and they will therefore be unable to identify the persistence of volatility over time.

The FIGARCH model.

In their work, Bollerslev and Engle (1986) have highlighted the persistence of shocks on the conditional variance through the IGARCH process to explain the lasting effects but not permanent shocks of volatility. Baillie Bollerslev and Mikkelson (1996) have tried to represent the fractionally integrated GARCH process. It is a presentation of prices to the dependence of long term that stimulates the presence of fractional integration that constitutes a solution of reconciliation between the process of type GRACH and IGARCH. Thus, the dynamic of short term is identified by the GARCH process, which is a process of short term memory.

The FIGARCH process is in contrast to the GARCH process that involves a short memory, it is a fractionally integrated model in which the long memory of volatility is taken into account, but the effect of a shock is not infinity such as the IGARCH model which decreases to an hyperbolic rate. This process is a function between the dynamics of short-term volatility surrounded by the GARCH process and the long term consideration by the fractional integration coefficient.

The FIGARCH process relates the dependence of the variance and the conditional return distributions with a long term memory effect in the conditional variance. Baillie and Al (1996) introduced the long memory in the conditional variance of the GARCH model and have

ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)

proposed a GARCH model with fractional integration, also called the FIGARCH model, or the conditional variance can be expressed as:

$$\phi(L)(1-L)^d \varepsilon_t^2 = \omega + [1-\beta(L)]V_t$$

With : $V_t = \varepsilon_t^2 - \sigma_t^2$, V_t can be interpreted as the innovation of the conditional variance with zero mean uncorrelated.

Knowing that: $\phi(L) = [1-\alpha(L)-\beta(L)](1-L)^{-1}$

So, and when we replace the operator of differentiation $(1-L)$ with $(1-L)^d$ The parameter is the fractional integration coefficient that takes values between 0 and 1.

The FIGARCH model can be expressed as following:

$$\phi(L)(1-L)^d \varepsilon_t^2 = \omega + [1-\beta(L)]V_t$$

The FIGARCH model offers a great flexibility for modeling the conditional variance, it is reduced to a GARCH process when d = 0 and an IGARCH process when d = 1.

We deal with in this article the behavior of the volatility persistence through long memory processes. We examine the persistence of shocks to volatility, with the process of long term memory fractionally integrated GARCH and we found the existence of a fractional variability in the short times, inferred that the effect of shocks of derivatives is not very persistent and that volatility is continued in the spot market.

We continued to examine the persistence of volatility using the impulse response functions and the variance decompositions of forecast errors in a structural VAR. We examined the impulse responses of the index following the various shocks of various components of the products. We found that the variability is not too persistent, since the impulse responses of these shocks are very low and remain in the interior of confidence intervals. As we noted that is the component of number of batches that permits to obtain in a long-term the market volatility.

DATA AND METHODOLOGY.

Our empirical analysis is to examine the persistence of shocks of derivatives on the French financial market volatility, using the fractionally integrated GARCH process. This study will be completed by examining the persistence of volatility through impulse response functions and the variance decompositions of forecast errors in a structural VAR. we use these econometric tools to validate our assumption which providing that the integration of the derivatives permit to reduce the volatility and restore the efficiency of the stock market of Paris and to test the persistence of this long term effect.

Our database is fractional, always covering the period from the first daily of months of 2008 until the end of this year. This period is chosen insofar as this year was characterized by a considerable vulnerability of courses and is mainly due to the consequences of the current global crisis that has severely hit the French financial market stability and this when the CAC 40 suffered a setback almost 40% of its value. We retain as variables, the adjusted courses of

ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)

the CAC40 index, the components of options (Calls and Puts), namely the number of batches, trading courses, maturity, strike price.

Thus and in order to observe nonlinear dynamics and long memory processes, we study the variability in the financial market by non-linear ARCH models, while using the procedure IGARCH and FIGARCH. We consider first, the variability of these markets by non-linear ARCH models and secondly we try to model these markets by the FIGARCH model, because our database is fractional. We model our data through a process of short memory (ARMA), and a long memory processes by the FIGARCH model.

We continue to investigate the persistence of volatility using the impulse response functions and the variance decompositions of forecast errors in a structural VAR, and to highlight the impulse responses of the index after the various shocks of various components of derivatives. In this step we examine the persistence of volatility of the CAC40 index following the introduction of derivatives from the autoregressive vector model (VAR) in order to Identify Structural impact of the shocks of different components of the derivatives and their response on the CAC40 index. Consequently, we determine the component which allows to the variability of the index to persist in the long term. We analyze different impulses of shocks to study the persistence of the volatility of the index CAC40 following the integration of the derivatives in a daily period of study from first January 2008 Till 31 December 2008. We rely on the CAC40 index as an endogeneous variable. We use the logarithm neperian for the variables of trading courses, and number of batches, maturity and exercise prices.

We estimate the CAC40 index in function of future contract and the options of puts and calls by the autoregressive vectoriel model.

$\Delta \text{CAC40}_t, \text{Lcourngo}_t, \text{Lnombr}_t, \text{Léchéance}_t$ et Lprixexer_t

$$\Delta \text{X}_{ht} = \begin{pmatrix} \Delta \text{CAC40}_t \\ \text{Lcourngo}_t \\ \text{Lnombr}_t \\ \text{Léchéance}_t \\ \text{Lprixexer}_t \end{pmatrix}$$

In general, the variables considered, being, I (0) or I (1), each component is stationary. This putative vector governed by a VAR, thus we accept a reduced form. Our identifications, inspired by Blanchard and Quah (1989), then allow to achieve a structural form of the VAR. Watson (1994) introduced the structural VAR model in its form VIMA

$$A_0 \Delta X_{ht} = A_1 \Delta X_{ht-1} + A_2 \Delta X_{ht-2} + ... + A_p \Delta X_{ht-p} + \varepsilon_t$$

$$A_0 \Delta X_{ht} = \left(A_1 L + A_2 L^2 + ... + A_p L^p\right) \Delta X_{ht} + \varepsilon_t = A(L) \Delta X_{ht} + \varepsilon_t$$

$$\Delta X_{ht} = \left(A_0 - A(L)\right)^{-1} \varepsilon_t = C(L) \varepsilon_t = \sum_{i=0}^{\infty} C_i \varepsilon_{t-i}$$

$$\Delta X_{ht} = C_0 \varepsilon_t + C_1 \varepsilon_{t-1} + ... + C_n \varepsilon_{t-n} + ... = \sum_{i=1}^{\infty} C_i L^i \varepsilon_t$$

ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)

The contemporaneous shocks may have crossed effects on ΔX_{ht}

because of the presence of the matrix on ΔX_{ht} because of the presence of the matrix C0 is not constrained as to the identity in the standard VAR models.

From a practical standpoint, a difficulty arises in identifying these shocks, and in particular on the assumptions indicated by their structure. To solve the problem, we use the technique used by Chamie, Deserres and Lalonde (1994), which consists of a triangulation of the matrix of long-term effects of shocks. The four disturbances are assumed to be independent and not autocorrelated. Their variance-covariance matrix is diagonal.

Furthermore ΔX_{ht} is stationary and means clustering allowed on a mobile representation, MA. The Shock of variables of future contracts and options had a permanent effect on the CAC40 index .The logarithms of the variables of calls and puts options, and future contract. We use the effect of filtering; since it exists any variables that are integrated in order one. ε_t : is the vector of structural random orthogonal and uncorrelated previously mentioned:

$$\varepsilon_t = \left[\varepsilon_{permanent}, \varepsilon_{\text{transitoire}}\right]'$$

The structural VAR model can be rewritten in the moving average form: in order to calculate the response functions to shocks and the variance decomposition of forecast errors. From these data, we estimate the autoregressive vector representation is in the form:

$$B(L)\Delta X_{ht} = e_t \text{ and } B(L) = I - \left(B_1 L + ... + B_p L^p\right)$$

Where its moving average representation can be written as follows:

$$\Delta X_{ht} = D(L)e_t \text{ and } D(L) = \left(I - \left(B_1 L + ... + B_p L^p\right)\right)^{-1}$$

e_t : is the vector of innovations. We assume that innovations are linear combinations of the structural shocks to the system. This is equivalent to assuming that there is a full rank matrix S of dimension (5,5) such that:

$$e_t = S\varepsilon_t$$

$$C(L) = D(L)\text{S}$$

$$A(L) = S^{-1}B(L)$$

Thus, it is easy to find the structural representation through the following equation VAR:

$$A(L) = S^{-1}B(L)$$

If we call Ω the variance-covariance matrix of innovations, structural representation of the model is obtained by calculating the 4 elements of the matrix S. The assumption of

ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)

International Journal of Business and Management Review
Vol.2, No.2, pp.73-90, June 2014
Published by European Centre for Research Training and Development UK(www.ea-journals.og)

orthogonality of structural shocks, $E(\varepsilon_t'\varepsilon_t) = I_n$ which helps to distinguish each other, and linearity of the relationship between the structural shocks and innovation allows us to write.

$$S S' = \Omega$$

As Ω : is a symmetric matrix of dimension (5,5), 5 elements of the matrix S can be identified from the previous equation. It is therefore necessary to introduce an additional constraint that the structural model is just identified. Knowing that D (1) represents the matrix of long-term effects of innovations on the level of the vector components ΔX_{ht} , the long-term effects of structural fluctuations on the level of components ΔX_{ht} are given by the matrix $\varphi = D(L)S$. We use in this second part of the impulse response functions and variance of the decompositions of forecast errors in a structural VAR to study the persistence of the volatility of the CAC40 index after the introduction of derivatives.

OBTAINED RESULTS

We have used fractional models to study the variability of the derivatives on the CAC40 index. To do this, we estimated the parameters of the IGARCH and FIGARCH models as long memory processes.

We studied the fractional volatility of « Call » options with the FIGARCH model. The table below is an estimate of IGARCH and FIGARCH models for « Call » options.

Table 1 : Estimation of IGARCH and FIGARCH models of Call options.

		IGARCH model		
Estimation	**Mean**	**Constant**	**PHI**	**B**
L. Trading courses	**8.095927537**	**1.1864348614**	**0.4330815128**	**0.5233094190**
L.Number of batches	**2.6455119028**	**0.7819341262**	**0.7887774164**	**0.7890091711**
L. Exercice prices	**13.104988500**	**0.000311478**	**1.035738360**	**0.640557889**
		FIGARCH model		
Estimation	**Constante**	**D**	**PHI**	
L. Trading courses	**8.1663428162**	**0.3259998177**	**0.6489251751**	
L. Number of batches	**2.5823044008**	**0.0260205094**	**0.9697142649**	

The variability of option is verified in an integrated because the variables are not stationary in level in GARCH model and that exist the trend changes. Also, fractional delays are very low (less than 0.5), and the conditional information is significant, the existence of a volatile process therefore remains applicable for call options.

We studied the volatility of derivatives expressed by “Put” options by a fractional model (FIGARCH) and IGARCH model. The table below corresponds to the econometric estimation of these two models, for the "put» options

ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)

Table 2: Estimation of IGARCH and FIGARCH for « Put » options.

IGARCH model				
Estimation	**Mean**	**constant**	**PHI**	**B**
L. trading courses	**12.989418981**	**0.003083750**	**0.972865158**	**0.337710602**
Maturity	**6.7002310949**	**0.0002535782**	**0.8294926880**	**0.674011116**
LNumber of batches	**2.402664671**	**3.3143354627**	**0.2220786902**	**0.2050366778**
L.Exercice prices	**12.989419434**	**0.003083790**	**0.972860736**	**0.337708595**
FIGARCH model				
Estimation	**Constant**	**D**	**PHI**	
L.trading courses	**8.5151960373**	**0.1184843103**	**0.8393974605**	
Maturity	**6.792152880**	**0.115025045**	**-0.983708944**	
LNumber of batches	**2.4421445715**	**0.9732970008**	**0.5117184648**	
L. Exercice prices	**12.988484108**	**0.003029756**	**0.329525480**	

From this table, we can conclude that there is a fractional volatility for the put options. This volatility is detected within a FIGARCH model since these variables are less than 0.5. The Fractional variability is explained partly by the volatility of put options over time, and secondly by the costs related to the obtaining of information. Furthermore, there is an integrated volatility for this option detected by the IGARCH model. However, this volatility is very small because the reaction coefficients are not significant.

We also studied the fractional volatility in the futures market. For this, the following table is an estimate of the various components of the futures contract, by FIGARCH and IGARCH techniques.

Table 3 : Estimation of IGARCH and FIGARCH models of the futures contracts.

IGARCH model				
ESTIMATION	**Mean**	**Constant**	**PHI**	**B**
L.Trading courses	**13.091501336**	**0.000111789**	**1.020853508**	**0.148534309**
Maturity	**6.690162364**	**-0.000000464**	**2.539985920**	**0.095339926**
L.Number of batches	**0.5369700029**	**0.1171011678**	**0.7496671610**	**0.7639406877**
FIGARCH model				
ESTIMATION	**Constante**	**D**	**PHI**	
L. Trading courses	**0.5653875843**	**0.0202244584**	**0.8536854440**	
Maturity	**0.569056339**	**0.0298207247**	**0.8114223545**	
LNumber of batches	**0.5690448429**	**0.8114293721**	**0.0298185070**	

ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)

From this table, we can see that there is a fractional volatility for futures contract, since that the fractional times are very low. Hence, the fractional variability is persistent. Also, we studied the volatility of the futures contract in an IGARCH model.

We demonstrated in our previous work and within the framework of the validation of the hypothesis which states that the introduction of derivatives promotes efficiency of spot markets, the existence of a long-term relationship between the CAC40 and options on this index, and we validated the existence of a linear fit of the deviation of the index relative to its fundamental value in an Error Correction Model (ECM), so as restoring forces take always a negative and statistically significant sign

In this work, we study the volatility of the target deflection of the CAC40 index, relative to their fundamental value. For this, the table below shows the linear and nonlinear volatility of the deviation from the CAC40 index.

Table 4 : Estimation of linear and non linear ARCH models of CAC40

Linear ARCH model	**Constant**	**ARCH (1)**	**ARCH (2)**	**ARCH (3)**	**Conclusion**
CAC40 and future Contrat	**0.000275**	**0.219492**	**0.163765**	**0.337821**	**ARCH (3)**
CAC40 and Put options	**0.002396**	**0.502321**			**ARCH (1)**
CAC40 and Call options	**1.633192**	**-0.014985**			**ARCH (1)**
Linear GARCH models	**Constant**	**ARCH (1)**	**GARCH (1)**		
CAC40 and future Contrat	**2.96* 10-5**	**0.182117**	**0.789265**		**GARCH (1,1)**
CAC40 and « Put » options	**0.002707**	**0.531729**	**-0.087167**		**GARCH (1,1)**
CAC40 and « Call » options	**0.036064**	**-0.046576**	**1.021098**		**GARCH (1,1)**
TGARCH Model	**Constant**	**ARCH (1)**	**(RESID<0)*ARCH (1)**	**GARCH (1)**	
CAC40 and future Contrat	**3.09* 10-5**	**-0.083440**	**0.362502**	**0.866016**	
CAC40 and « Put » options	**0.002755**	**0.856869**	**-0.434083**	**-0.124604**	
EGARCH Model	**Constant**	**|RES|/SQR [GARCH] (1)**	**RES/SQR [GARCH] (1)**	**EGARCH (1)**	

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CAC40 and future Contrat	**-0.473349**	**0.137375**	**-0.222299**	**0.950188**
CAC40 and « Put » options	**-4.451320**	**0.635630**	**-0.034429**	**0.290923**
CAC40 and « Call » options	**0.811125**	**0.027804**	**-0.026682**	**-0.848715**

IGARCH model	**Mean**	**Constant**	**PHI**	**B**
CAC40 and future Contrat	**0.0024837122**	**0.0000527204**	**0.9529120941**	**0.7381307119**
CAC40 and « Put » options	**0.0056204079**	**0.0016689066**	**0.7316000605**	**0.2455146511**
CAC40 and « Call » options	**-0.002123550**	**3.119693842**	**-0.836690164**	**-0.894439138**

FIGARCH model	**Constant**	**d**	**PHI**
CAC40 and future Contrat	**0.0027859641**	**0.0000290125**	**0.7782775477**
CAC40 and « Put » options	**0.0071050188**	**0.0012724228**	**0.2804467612**
CAC40 and « Call » options	**0.0550692627**	**1.2258201442**	**0.0324403709**

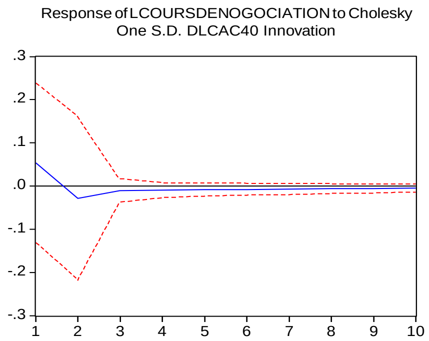
We can see from this table that investors are more attracted by the derivative market as the spot market, since volatility is reduced in these markets, especially in the market for puts and calls options. At this level, it seems clear that investors prefer to intervene in the options markets. The reduced volatility in the financial market following the introduction of these products is verified from the linear modeling of the variability of the deviation of the CAC40 index as a function of the futures contract and the put and call options. This reduction is due to the ARCH model that takes only the optimal value conditional delays and is equal to one. That is to say, the information becomes asymmetrical instantly and the speculators can acquire the information in a shorter time. Also, volatility diminished within a GARCH model since as the reaction coefficient of this model is not significant, and the persistence of volatility is linearly very low, since the ARCH and GARCH coefficients exceed 1. Despite that there is a fractional variability FIGARCH, this variability is very marginal and have not a very good chance in the

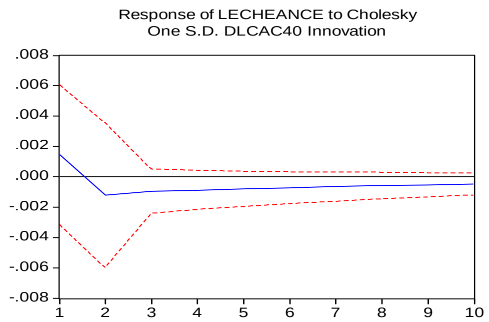
ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)

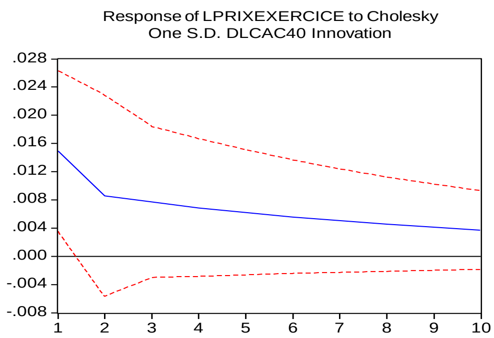
contraction of the deviation of the CAC40 index from options. We also note that the coefficients of the IGARCH model are not significant in an integrated context. We can finally deduce the preference of speculators to the derivatives market.

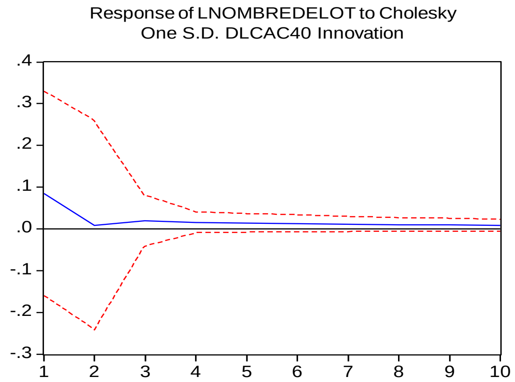
We recall, moreover that the concept of efficient capital markets is associated with lack of memory, and short-term memory does not call into question the efficiency of these markets, because some autocorrelations are not significant in the short- term and can be used to speculate. Stakeholders aren't therefore unable to make abnormal profits and the market is assumed in this case efficient. However, when the difference in the courses persists, it may be reflected by the presence of a long memory that goes against the property of efficiency of the market. More the gap persists, the more it will be possible to make profitable strategies, which calls into question the assumption of efficient capital markets. However, and for our case we note from the obtained results that the persistence of volatility is very low, and the linear variability is very marginal, leaving infer that the introduction of derivatives make lowers the variability of spot market and therefore allows improving its efficiency. This leads to win the trust of investors which tend to concentrate their activities in the derivatives market and this is proving the preferences for these products.From the reactions functions and the decompositions of the variance of forecast errors, we can identify the persistence of the volatility of the CAC40 index after the introduction of options specified by options "Call and Put".

The graphs below show the functions of the impulse responses of the CAC40 index after the introduction of stock options.









From these graphs we can see that the volatility of the CAC40 index is not persistent, since the functions of the impulse responses are to the inner of the confidence interval, and are very low.

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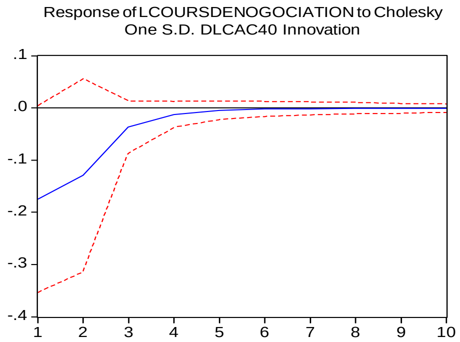
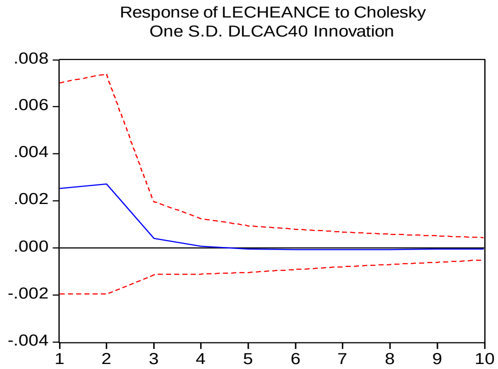
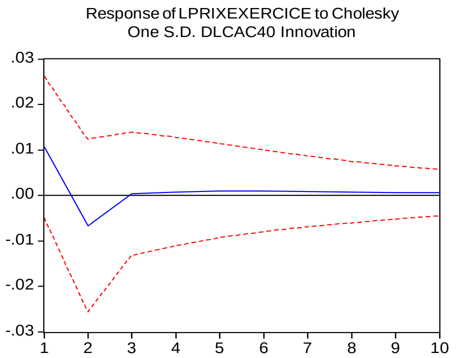
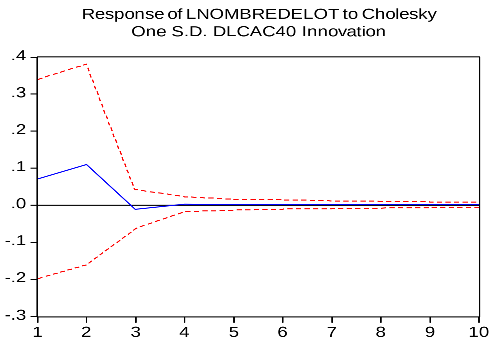
The variability of this index will be lessened in the case where derivatives expressed by the purchase options are introduced. So we cannot identify the persistence of the volatility of the index's market capitalization Paris when we introduce the call options.

We can also study, the persistence of the volatility of the CAC40 index after the introduction of derivatives expressed by the "Put" options, and this from the functions of the impulse responses of the various shocks of trading courses, the maturity, the number of batches, and the exercises prices.









We can conclude while referring to the graphs above, that the effect of the volatility of the CAC40 index after the introduction of put options is amortized since most of the functions of impulse responses converge to zero, and are in the inner of the confidence interval.

In this section, we analyze the persistence of the volatility of the CAC40 index after the introduction of the futures contract. The latter is composed by trading courses, the maturity and the number of batches. Except the number of batches, all other variables are integrated of order one. We use the filtering effect of order one, in order to stabilize the variables of trading courses and of the maturity. We study the persistence of the variability of the french index market capitalization, by the impulse response functions below.

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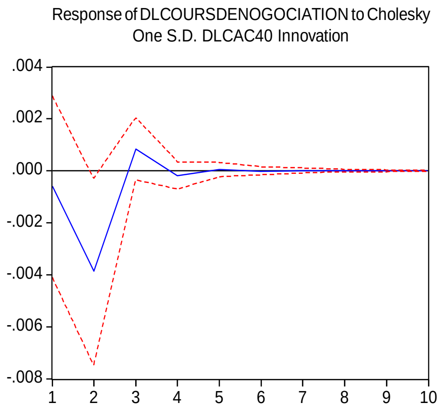

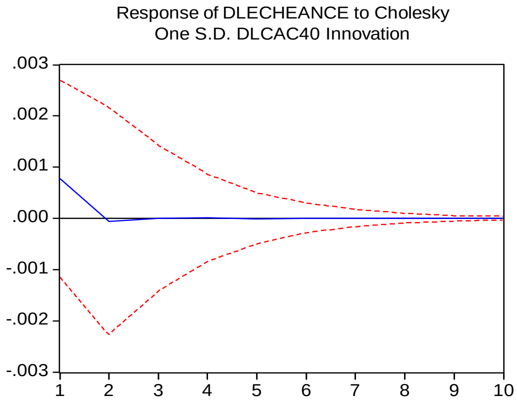

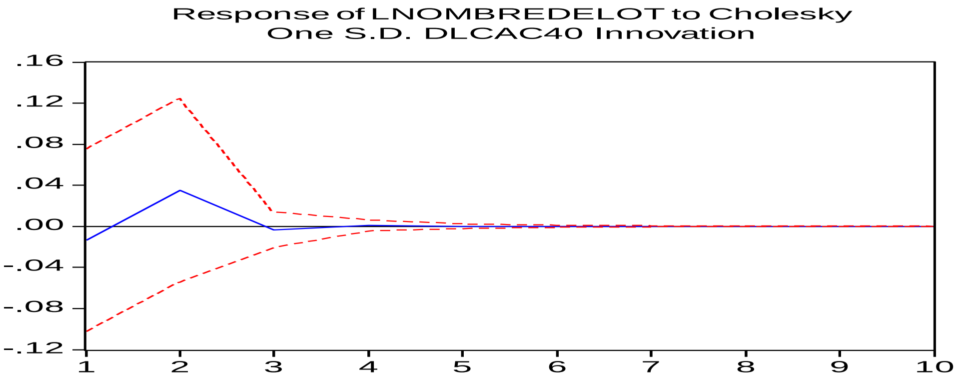

The shock impulses of the various components of the futures contract are very low. These are shown as an indicator of non-persistence of variability when integrating the CAC40 index futures contract.

From the impulse response functions of «calls and puts" options, and futures, we can see that the volatility of the index's market capitalization decays when introducing derivatives since that the functions of responses are all to the interior of the confidence interval and converge asymptotically to the abscissa axis. Hence, we can assume while using the Cholesky decomposition within a structural autoregressive model that the contagion effect on the variability of the CAC40 index is not persistent in the stock exchange Paris. We continue our analysis by performing the decomposition of variance to determine the contribution of each component of derivatives on the expected variance of the CAC40 index. For this, the following table shows the variance decomposition for ten subsequent periods.

The table below corresponds to the expected market capitalization of stock market index after the introduction of futures contract.

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Table 6 : The Decomposition of the CAC40 index after introduction Call options

Period	S.E.	DLCAC 40	DLTrading courses	DLMaturity	LNumber of batches
1	0.026008	0.039158	0.070310	0.201199	99.68933
2	0.026222	0.299423	0.070827	0.501861	99.12789
3	0.026248	0.301956	0.073706	0.599615	99.02472
4	0.026256	0.301989	0.073934	0.628736	98.99534
5	0.026258	0.301969	0.073951	0.637869	98.98621
6	0.026259	0.301961	0.073952	0.640806	98.98328
7	0.026260	0.301958	0.073952	0.641760	98.98233
8	0.026260	0.301957	0.073952	0.642072	98.98202
9	0.026260	0.301956	0.073952	0.642174	98.98192
10	0.026260	0.301956	0.073952	0.642207	98.98188

In this table, we can see that the share of the anticipated variability of the CAC 40 index after the introduction of options is explained by the component of number of batches. The predicted risk of variability of the index due to the use of options may be due to the number of batches. The investors may not therefore grant total and absolute confidence in shopping options and that the increased use of these options can cause market volatility in the future. In this case the Paris stock market cannot be efficient in the long term due to the increased use of derivatives .

The table below traces the share of each component options sales in the anticipated variance of the volatility of the CAC40 index after the introduction of these options.

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Table 7 : The Decomposition of CAC40 index after introduction of « Put » options.

Period	S.E.	DLCAC40	Ltrading courses	LMaturity	L.Number of batches	L. Exercice prices
1	0.026111	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.026306	99.17767	0.036529	0.432605	0.323837	0.029355
3	0.026314	99.16073	0.037891	0.439392	0.323654	0.038329
4	0.026315	99.15410	0.038445	0.439943	0.324306	0.043205
5	0.026315	99.15059	0.038625	0.439935	0.324428	0.046426
6	0.026316	99.14803	0.038727	0.439983	0.324508	0.048750
7	0.026316	99.14613	0.038796	0.440042	0.324560	0.050474
8	0.026316	99.14470	0.038846	0.440093	0.324598	0.051765
9	0.026316	99.14362	0.038883	0.440134	0.324627	0.052733
10	0.026316	99.14282	0.038911	0.440164	0.324648	0.053461

This table has validated the high share of the logarithm of the number of batches in predicting the variability of the variance of the index's market capitalization Paris after the introduction of futures contracts. Hence, the predicted risk of the volatility of the CAC40 index after the introduction of put options may be due to the number of batches.

From the decomposition of the expected variance of the volatility of the index of the Paris Stock Exchange and functions of the impulse responses of the various shocks of derivatives , we can see that volatility is not persistent on this index , since responses impulse of these shocks are very low and remain inside the confidence intervals. As we can see in the long term that increased transaction volumes due to the concentration of investors' activities in derivatives markets leading to increased risk of volatility of the CAC40 index. For this, it is better for these investors to reduce their total confidence in the increased use of derivatives, which can lead to long-term to the situations of instability and volatility persistence in financial markets.

CONCLUSION

We studied in this article the behavior of the persistence of volatility through a process of long memory. We examined the persistence of shocks to volatility, with the process of long term memory with fractionally integrated GARCH type, and we found the existence of a fractional variability in the fractional short times, leaving deduce that the effect of shocks of derivatives is not very persistent and the volatility is continued in the spot market.

We continued to examine the persistence of volatility using the impulse response functions and the variance decompositions of forecast errors in a structural VAR. We examined the impulse responses of the index following the various shocks of various components of the products. We found that the variability is not too persistent since the impulse responses of these shocks are very low and remain on the inner confidence intervals. As we noted, this is the component of number of batches that provides long-term market volatility.

So we conclude and at the end of this work that it is well to give confidence to the use of derivatives, but that trust cannot be guaranteed for the long term, since we found and in examining the persistence of volatility over time, that the variability of the target is marginal, and it has not a very good chance in the contraction of the deviation from the target, and that the higher volumes of transaction due to the concentration of investors activities in derivatives markets creates in the long-term an increased risk of volatility of the CAC40 index.

However, we can deduce and at the end of our studies based on the beneficial effect of derivatives on the volatility of financial markets, and the degree of confidence accorded to their users, that the widespread use of these products generates destabilizing effects. And that these products are not without dangers on the stability of financial markets, the current global crisis provided a striking proof, and it is since those criticisms addressed to the derivatives have strictly speaking, focusing mainly on the misperception of risk.

These products , and at the end of their negative impact on the volatility of markets and the financial system in general, have been qualified according to Warren Buffet, and Alfred Steinher of " Weapons of mass destruction " and " wild beasts ." However and given the dangers posed by these products to their users to know if, the benefits provided by these products outweigh the dangers posed by these latters ?

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ISSN: 2052-6393(Print), ISSN: 2052-6407(Online)