Islamic Finance: A Bulwark against Crisis?

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Islamic Finance: A Bulwark against Crisis?

Hatem Derbel [α], Neila Dammak [σ] & Ali Chkir [ρ]

Abstract -The aim of this paper is to show that the Islamic finance is more stable than the conventional finance constituting, thus, a means to reduce the impact of financial crisis. Using a VAR model for the financial indexes of France (SBF250), United States (DOW JONES), United Kingdom (FTSE100), Indonesia (JAKISLM) and Saudi Arabia (TADAWUL) covering the period (26/02/2007- 12/20/2010), we show that the effect of a shock on the American market during the period of crisis is negatively transmitted on all other markets, but with a small extent on the market using the method of Islamic financing.

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I. INTRODUCTION

If we exclude the introduction's trials of Islamic financial institutions in the mid of the 40s in Malaysia and in Pakistan at the end of the 50s, the first Islamic bank was established in 1963 in Mit Ghamr in Egypt (Sid Ahmed, 1982). However, the existence of this bank did not last for a long time and it was closed in 1967. It is only from the seventies where we noted the true launching of Islamic finance with the creation of the first Islamic banks, notably Islamic Development Bank (Jedda), Dubai Islamic Bank and Albaraka Banking Group (Bahrain).

Since, the Islamic financial institutions have developed in a remarkable way through several countries mainly in the Arab world (Saudi Arabia, Jordan, Dubai) and in Asia (Malaysia, Indonesia). From the 80s, Europe became interested in Islamic finance by opening in 1983 in Luxembourg the first insurance company (takaful) based on Islamic law, Shari'a, then by the creation of the first Islamic bank in 2004 which is The Islamic Bank of Britain. The aim of these financial institutions is the development and the promotion of new ways of financing in compliance with the precepts of Islam.

Nowadays, the area of Islamic finance is booming. According to a study established by an Islamic bank (Calyon), this market represents between 500 and 1000 billion dollars. Some products show an impressive growth as the Islamic bond market, the sukuks.

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The development of this sector does not come only from the increase of the Muslim population immigrant or not, who is looking for financial products conform to Shari'a, but also from its efficiency and its performance. Several financial analyses show that Islamic finance constitutes an ethical choice that avoids the drift of speculation while reinstituting some values neglected by conventional finance, like trust. It prohibits not only investment in sectors considered "illicit" such as alcohol, pork, prostitution and gambling, but also it prohibits the payment of interest and speculation. Only investments in tangible assets are allowed.

The Islamic finance market is attracting a great interest. With annual growth rates of 15-20% on overage over the last five years, it represents an international segment recording the fastest growth in the finance sector. This led us to be interested in this subject and to wonder us on the contribution of Islamic finance in comparison with the conventional finance. A big part of literature contains comparisons of instruments used in Islamic and conventional banking, and discusses the challenges of normalization and supervision linked to the Islamic banking (Sundararajan and Errico (2002); World Bank and FMI (2005); Ainley et al. (2007); Semelle (2007); Jobst (2007)).

However, there are very little empirical analysis on the role of Islamic finance in the financial stability. Some papers discuss the risks in Islamic financial institutions only in a theoretical framework, while empirical studies on Islamic banking are concentrated on issues linked to efficiency (Yudistira (2004); Moktar Abdullah and Al-Habshi-Habshi (2006)). Although several studies on Islamic finance have been developed, its role in financial stability has not yet been analyzed in a consistent, transnational and empirical way.

Our contribution in this paper is to lead an empirical study in order to check whether a finance based on Islamic law is more stable or not than a conventional finance. To this end, this paper is structured as follows: in section 2 we present the difference between Islamic finance and conventional finance. Section 3 discusses the relationship between Islamic finance and financial stability. In section 4, we will conduct an empirical study to determine whether countries using Islamic finance were less affected or not by crisis in comparison with those who opt for traditional finance. Finally, section 5 concludes the paper.

II. Islamic Finance and Conventional Finance: Convergence Or Divergence?

The purpose of a financial system, whether it is conventional or Islamic, is the mobilization of financial resources and their allocation among various investment projects. However, the basic principles which govern an Islamic financial system are different from the spirit of conventional finance. If in the "classic" finance, the norm which chairs the decisions of an economic agent is to optimize the couple return - risk of its investments, the profitability is not the only nor the main criterion of decision for the Islamic operators.

Islamic finance is a financial system which relies primarily on *Shari'a*. This last is a set of laws and rules which govern in Islam the economic, social and political life. The existence of such system lies in the desire to ensure that financial products are compatible with legal and ethical principles of Islam.

The prohibition of riba is one of the sources of divergence of view between Islamic finance and conventional finance. From the etymological point of view, the term *riba* comes from the Arab word "arba" which means to increase. This term refers to two distinct concepts in the terminology of conventional finance, namely the interest rate and usury. The first term indicates the amount paid for the use of money, whereas the second one refers to the offence committed by one who lends money at excessive rate. Although usury in conventional societies should be condemned, the interest on the contrary is accepted. However, Muslim philosophy condemns and prohibits any interest rate it is usury or not.

The prohibition of the practice of interest is not foreign for other religions. Indeed, it also prevailed among Christians and Jews. The prohibition of *riba* in Islam finds its origin in the Quran, the sacred book of Muslims and the main source of Islamic law. The Quran forbids expressly, in several times, the practice of *riba*. «... O the believers! Fear Allah and abandon the usurious interest, if you are believers ». Quran, Sura 2, Verse 278.

The perception of a fixed remuneration, only after the passage of time and disconnected from the real profitability of the investment project, is prohibited by the Shariah. It is considered unproductive and socially destructive. In fact, achieving substantial profits from usurious contracts, the owners of capital would take more risk or to engage in commerce or in any economic activity. This will lead to the emergence, alongside the loans with interest, other behaviors as harmful as the wear that is hoarding. In this particular vision come from two other requirements of Islamic law. First, hoarding is prohibited because it diverts funds from productive activities. Then, what is even more fundamental, any financial transaction must be backed by real assets. Thus, financial products such as subprime mortgages can not be created in this system.

The prohibition of riba is a logical perception that Islam has the function of money in an economy. In conventionel economies, money has three functions: medium of exchange, unit of account and instrument of transfer value over time (store of value). But according to the logic of Muslim philosophy, money is a simple instrument to create real value and to facilitate trade but do not become the object of exchange itself. It therefore does not fulfill this role transfer value over time.

The elimination of interest plays a central role in etablish order in the economic. The Islamic economy is based on a different perception of the value of capital. It is the work that generates wealth, not capital. Money trading is not comparable to other businesses. Muslim philosophy and endorse the trade of goods but prohibits any profit from a transaction purely "financial".

The management of uncertainty and profit sharing between different stakeholders in a financial transaction is another source of conflict between Islamic finance and conventional finance. Islamic finance promotes equitable sharing of gains and risk between the investor (lender) and the entrepreneur (borrower), whatever the form of financing used. A financial transaction that transfers all the risks associated with an investment project on a single stakeholder is therefore contrary to the principles of Shari'ah. Sharing arrangements must be agreed in the contract signed by the determination of a proportion of loss or gain. Thus, some forms of financing from conventional financial system are all in keeping with the spirit of the Shariah and replicable in Islamic financial system, while others, including the classical debt contract, are automatically excluded. In a financial system based on sharing profits and risks, such a situation could occur because investors (ie banks) are able to properly monitor the progress of the investment project.

Moreover, Muslim jurisprudence prohibits the uncertainty in the terms of a contractual relationship. The concept of *gharar* refers to any exchange in which there is an imprecise, ambiguous, or uncertain element. That includes not only trade in goods that the salesman is not in position to sell, but also the contracts which depend on an unpredictable event. The uncertainty in case of sale of a future product consists in the impossibility of predicting the quality and/or the quantity of the sold product. This last must be clearly defined and known so that the sale is valid and so that there is no hazard.

It should be noted that goods, the object of the exchange, should not necessarily exist at the time of the signing of contract. Thus, the forward sale is not condemned. The transaction is in conflict with the *Shari'a* principles only if the terms of the exchange are

conditional on a dubious future event which does not depend on the contractors.

The *maysir* is defined as any form of contract in which the right of the contracting parties depends on a random event, such as gambling. The operations which rest on pure speculation in order to carry out a profit are illicit (*haram*) and thus are prohibited in Islamic law.

Finally, Islamic finance prohibits investment in the illicit economic activities. The financed assets must be *halal*, i.e. relative to an activity in conformity with *Shari'a*, which exclude for example the activities related to the sectors like alcohol, the armament, the pornography,… etc.

Two important points summarize the main difference between Islamic finance and conventional finance:

– The moral dimension in the decisions financial entails change in the internal organization of the bank (including the establishment of a Shariah board) and involves a number of additional obligations (such as managing Funds collected through Zakat).
– The rules operating of the Islamic bank will also change the relationship bank-customer as it exists in the world of conventional finance. Since the applicant is, to some extent, investor and it is partly the same risks that the bank can no longer talk only of a depositor-relationship bank or lender-borrower relationship but a real investor-entrepreneur, similar to that which exists in direct investment transactions. Thus, in its credit allocation decisions, the assessment will take as an entrepreneur and the economic potential of his project. For its part, the client takes into consideration not only the profitability of investment offered by a bank but also its social commitment and his commitment to the principles of Shari'ah.
– However, in reality, there are a number of convergences between conventional finance and Islamic finance:
– In search of greater profitability, conventional banks are expanding their investment activities.
– The Islamic banks are developing products such as Murabaha, close to the traditional debt instruments on own account and on behalf of others.
– These trends partly blur the differences between Islamic banks and conventional banks.

III. Financial Crisis and Islamic Finance

The financial crisis which was triggered in 2006 by a crash of the subprime mortgages in the United States, and revealed to the world in February 2007, then transformed into international financial crisis since August 2007 is considered as the most serious of the post-war period. It did not only affect the mortgage credits granted to the risky American households, but it was propagated towards the banking and financial system. It has crippled the financial systems of several countries and caused the disappearance of the major financial institutions. The crisis has shown that conventional finance is very vulnerable and unable to survive alone. Islamic finance has been erected as an alternative to the conventional financial system.

However, the debate on the relationship between Islamic finance and stability during the period of subprime crisis is with double edge. On the one hand, several financial analysts consider that the Islamic finance, by its nature, is more stable than the conventional finance (Moody's (2008), Bouslama.G (2008), Drown.C (2009)). Indeed, in conventional finance, the proliferation of financial innovations in deregulated markets has led to a massive monetary creation with a very thin real basis. The excessive use of models of securitization made difficult to understand the characteristics of new products in terms of risk. The central bank may also play a crucial role in financial instability if it allows an expansion of the credit not sustained by adequate resources, *i.e.* a credit growth without a sufficient growth of the saving in the system. So the central bank allows, through its monetary policy, the banks to be involved in an expansion of credit without counterpart (in terms of savings). In fact, it is not the expansion of the credit which can result in a crisis situation, but it is the expansion of credit without counterpart which leads to a diversion of the real saving from the productive activities towards the non-productive activities, which in its turn weakens the creative process of real wealth. The absence of these devices in Islamic finance made this type of financing a more stable system. The prohibition of interest and devices of sharing profits and losses create a financial system based on reel assets. Consequently, banks cannot initiate or accentuate a speculative process. The credit is based on real savings and this one can release an output only if it is directly invested in productive activities. The banks are competed only for the real investment and their resources are reinvested in real activities. As a result, economic growth is durable and does not contain negative impact on social justice since inflation cannot be used to impoverish creditors and employees and to enrich debtors and speculators.

In addition, deposits in a bank cannot be transformed into loans or used to buy financial assets and become reserves or a base for a new loan at another bank, contributing thus to a creation of purchasing power and to inflation. The deposits must be reinvested directly by the bank in production and trade activities.

The Islamic financial system is a system where there are no assets without risk and where all the transactions are based on the sharing of profits or losses. The contracts like futures, options, swaps are prohibited because their realizations are characterized

by an obvious uncertainty. However, the operations and the products of Islamic finance are not only strongly leaned and closely related to the real economic sphere but also completely independent and are disconnected from the traditional financial sphere. This has the effect of reducing uncertainty, duct savings towards the real and material investments, and the completely elimination of speculation and its effects which, often, distort economic predictions, skew the prices of goods and inflate the consequences of a possible crisis.

In Islamic finance, interest rate is not used as monetary policy instrument. The central bank does not refinance the banks, and does not provide financial instruments to the banks as it is the case in conventional finance. The central bank applies quantitative ceilings on the monetary aggregates. Such a policy was effective in maintaining financial stability and in the exclusion of speculative booms and inflation.

The sources of financial instability of the conventional system, i.e. the abundance of liquidities, the credit without counterpart, the speculation and the fixing of interest rate by the central bank are absent in Islamic finance, ensuring, thus, the stability of this system. A finance based on the rules of *Shari'a* condemns the interest which encourages the polarization of money in the hands of minority, but institutes, in compensation, the sense of sharing and equitable redistribution of wealth.

On the other hand, other financial analysts consider that Islamic banks are unstable and may lead to many risks in the financial system that differ from those of conventional banks, such as liquidity risk, operational risk and legal risk. Choong and Liu (2006) argue that Islamic banking services, at least as practised in Malaysia, diverge from the sharing of profits and losses principle, and in practice are not very different from the traditional system. Their results suggest that the quick growth in Islamic banking sector is principally fed by the revival of Islam in the world rather than by the advantages of the sharing of profits and losses principle, and that Islamic banks should be regulated in a similar way as their western counterparts.

The prohibition of interest may result in the underdevelopment of funding sources. Thus, Islamic banks face specific obstacles in the management of liquidity. Moreover, as indicated by Noyer.C (2009), the weakness of standardization of the products and the lack of harmonization of Islamic norms, due to differences between the interpretations of the *Shari'a* specialists, may increase the operational risk and legal uncertainty making, thus, the follow-up of the sharing of profits and losses principle much more complex as the volume of the bank transactions increases. Similarly, the prohibition to finance certain sectors limits the categories of assets eligible for investments, which contributes to increase the risk of concentration in sectors more sensitive to the conjuncture. In the same

context, Cihák.M and Hesse.H (2008) show that the more the size of the Islamic banks increases, the more they find difficulties of adjusting their monitoring systems of the credit risk. They also note that the market share of Islamic banks has no significant impact on the financial strength of other banks.

The analysis of the principles of Islamic finance does not allow, alone, resolving the question of the relationship between Islamic finance and financial stability. It is necessary to supplement them by an empirical analysis. For this reason, we will conduct an empirical study to check whether countries practicing Islamic finance were relatively less affected by the crisis than those using the conventional method of financing.

IV. Empirical Study

a) Data and methodology

Our purpose in this empirical section is to determine whether Islamic finance is able to absorb shocks in the context of a global economy very disturbed by the world financial crisis. To do this, we use a VAR model including a sample of 5 markets indexes: of France (SBF250), United States (DOW JONES), United Kingdom (FTSE100), Indonesia (JAKISLM) and Saudi Arabia (Tadawul). The data, collected from Datastream, are daily frequencies and cover the period from 26/02/2007 to 12/20/2010.

b) Descriptive study

According to Fig.1, we note that all series in level have an upward trend which disappears when the series are in first difference. All series of the market indexes relating to the United States, France, Saudi Arabia, United Kingdom and Indonesia, are a priori non-stationary.

Figure 1 : Descriptive study

LFTSE100

DLJAKISLM

DLFTSE100

LSBF250

LTADAWUL

DLSBF250
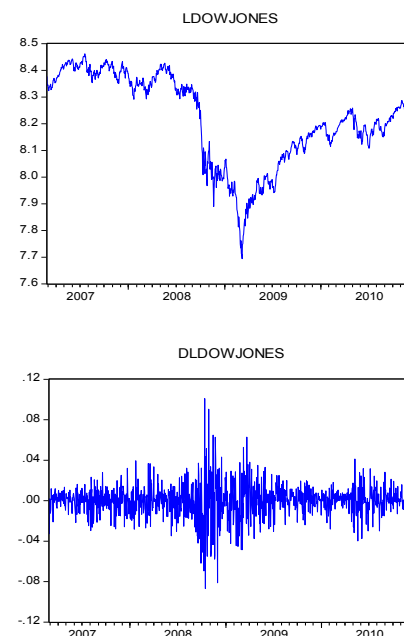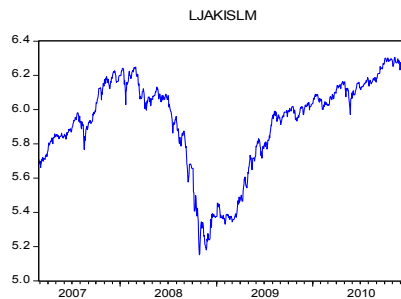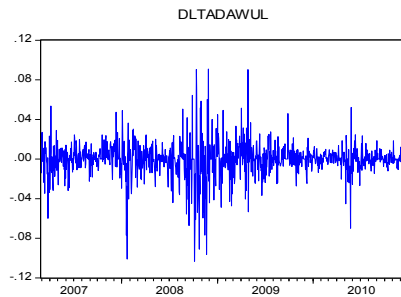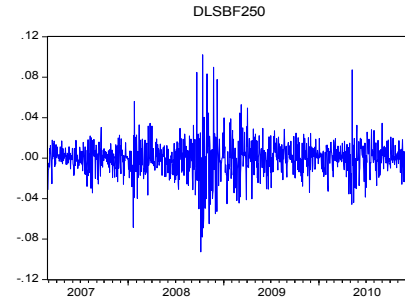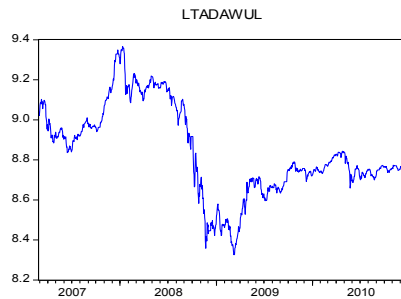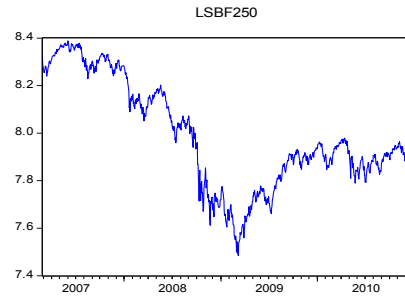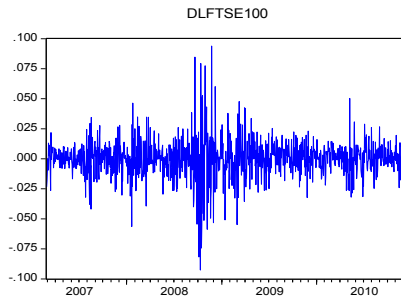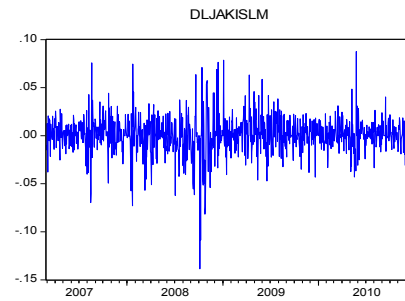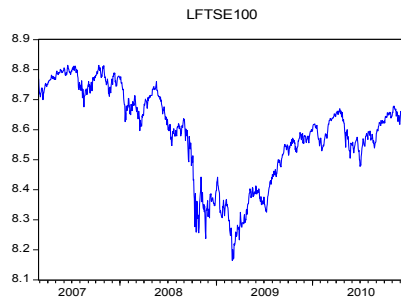
c) Unit Root test

To study the stationarity of variables, we use the Augmented Dickey-Fuller test (ADF). Table 1 reports the results of this test. These results show that all the market indexes are non-stationary in level, but stationary in first difference and, consequently, they are integrated of order one (I (1)).

DLTADAWUL

LJAKISLM

Table 1 : Unit Root Test

	Lag	Model*	Stat ADF	T_{ADF}		Processus
LSBF250	1	3	-0.720197	1% -2.567288 5% -1.941142 10% -1.616485		DS
DLSBF250	1	3	-33.40500	1% -2.57291 5% -1.941142 10% -1.616485		Stationnary
LDOW JONES	2	3	-0.158381	1% -2.567293 5% -1.941142 10% -1.616485		DS
DLDOW JONES	2	3	-25.84998	1% -2.567293 5% -1.941142 10% -1.616485		Stationnary
LFTSE100	1	3	-0.472821	1% -2.567293 5% -1.941142 10% -1.616485		DS
DLFTSE100	1	3	-33.40500	1% -2.567291 5% -1.941142 10% -1.616485		Stationnary
LJAKISLM	1	3	0.704948	1% -2.567288 5% -1.941142 10% -1.616485		DS
DLJAKISLM	1	3	-29.46087	1% -2.567291 5% -1.941142 10% -1.616485		Stationnary
LTADAWUL	1	3	-0.472411	1% -2.567293 5% -1.941142 10% -1.616485		DS
DLTADAWUL	1	3	-29.16458	1% -2.567291 5% -1.941142 10% -1.616485		Stationnary

(1) : Model no constant and no trend
(2) : Model with constant
(3) : Model Model with constant no trend

d) The cointegration test

The unit root test indicates that all the series of market indexes exhibit the same order of integration. According to the terminology of Engel and Granger (1987), there may be a possible long-term stable relationship between these variables. To test cointegration, we use the approach of Johansen (1995). The first stage of this analysis is to determine the number of gap of the autoregressive vectorial model (i.e. VAR (p)). To do this, we estimate some numbers of autoregressive processes and we retain the one that jointly minimizes the criteria of Akaike and Schwartz. Table 2 presents the overall results.

Table 2 : Number of lags.

	P=1	P=2	P=3	P=4	P=5
Akaike information criterion	-29.27527	-29.72890	-29.77227	-29.79541	-29.77246
Schwarz criterion	-29.12745	-29.45768	-29.37744	-29.27679	-29.12985

The minimization of the Akaike criterion led to retain 4 gaps, whereas for the Schwartz criterion, that leads us to retain two gaps. According to the principle of parsimony, we adopt two gaps (P=2). From table 2, we can conclude that this is a VAR model of order (2).

Johansen (1995) proposed a test based on the vectors corresponding to the highest eigenvalues of the matrix

model presented by equation (1):

$$\Delta X_t = \delta_0 + \Pi X_{t-1} + \delta_1 \Delta X_{t-1} + \mu_t$$

$$t = 1, \ldots, T \qquad 1$$

Where : X_t : the vector of dimension (k×1) which contains current and lagged values of K variables; Δ : the operator of first difference; δ_0 : the matrix of dimension parameters (k×1); δ_1 : the matrix of dimension parameters (k×k); μ_t : the vector of random errors; Π : the matrix which determines the number of cointegrating relationships.

From the eigenvalues of the matrix (Π), Johansen statistic can then be determined. The results of tests are based on the comparison of the statistic LR (likelihood ratio) with the critical values at 5% level. If this statistic is higher than these values, we conclude that there is at least one cointegration relationship between variables; otherwise, no relationship of cointegration exists between them. The results of the trace used to determine the rank of cointegration are presented in table 3 below:

Table 3 : Test of cointegration.

Date: 12/23/10   Time: 01:02
Sample (adjusted): 2/28/2007 12/20/2010
Included observations: 994 after adjustments
Trend assumption: Linear deterministic trend
Series: LDOW JONES LFTSE100 LSBF250 LTADAWUL LJAKISLM
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic
None	0.033598	67.41256
At most 1	0.018796	33.44227
At most 2	0.009124	14.58113
At most 3	0.003918	5.470157
At most 4	0.001576	1.567685

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The exam of this table shows that there is no cointegration relationship. Before estimating our model, we conduct the causality test of Granger to examine not only the interdependance between markets, but also to specify the sense of causality.

e)   The causality test

To better specify the nature of short-term dynamics and the sense of causality, we used the causality test of Granger (1969). The causality test specifies the short-term relationship and indicates which of the variables has an impact on the other. The results of the Granger causality tests are reproduced in table 4.

Table 4 : Granger causality tests.

Pairwise Granger Causality Tests
Date: 12/24/10   Time: 00:00
Sample: 2/26/2007 12/20/2010
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
DLFTSE100 does not Granger Cause DLDOW JONES	994	0.00135	0.9707
DLDOW JONES does not Granger Cause DLFTSE100		162.765	1.E-34
DLSBF250 does not Granger Cause DLDOW JONES	994	0.28234	0.5953

DLDOW JONES does not Granger Cause DLSBF250		183.298	2.E-38
DLTADAWUL does not Granger Cause DLDOW JONES	994	0.84101	0.3593
DLDOW JONES does not Granger Cause DLTADAWUL		53.0819	7.E-13
DLJAKISLM does not Granger Cause DLDOW JONES	994	0.01533	0.9015
DLDOW JONES does not Granger Cause DLJAKISLM		93.4584	3.E-21
DLSBF250 does not Granger Cause DLFTSE100	994	3.44048	0.0639
DLFTSE100 does not Granger Cause DLSBF250		3.36008	0.0671
DLTADAWUL does not Granger Cause DLFTSE100	994	16.5732	5.E-05
DLFTSE100 does not Granger Cause DLTADAWUL		22.7182	2.E-06
DLJAKISLM does not Granger Cause DLFTSE100	994	0.00797	0.9289
DLFTSE100 does not Granger Cause DLJAKISLM		42.5797	1.E-10
DLTADAWUL does not Granger Cause DLSBF250	994	22.3118	3.E-06
DLSBF250 does not Granger Cause DLTADAWUL		25.2581	6.E-07
DLJAKISLM does not Granger Cause DLSBF250	994	1.01411	0.3142
DLSBF250 does not Granger Cause DLJAKISLM		47.1066	1.E-11
DLJAKISLM does not Granger Cause DLTADAWUL	994	15.8019	8.E-05
DLTADAWUL does not Granger Cause DLJAKISLM		6.60096	0.0103

In light of the results of Granger causality tests, we observe bidirectional causality between the couples of markets (France, Arabie Saoudite) et (Arabie saoudite, Indonésie). However, we note the presence of unidirectional causality from the U.S market to all markets and from France to Indonesia.

The absence of cointegration between nonstationary series and the existence of causalities between the series stationary in first difference, leads us to estimate a model VAR in difference.

f) Estimation of the model

The estimations are provided by the Eviews software. The found results are better analyzed by using response functions to a shock. In this paper, we are only interested in analyzing the impact which a shock could have on the US market on the other markets. This shock, occurring in one period, is not maintained. But, since the model includes an autoregressive and an economic dynamic, through functions of reaction, the shock persists in attenuated form during some time. The initial positive shock on the DOW JONES tends to be reduced gradually as other markets take it into account later in their functions of reaction.

– We note first that the effect of the shock on DOW JONES is more important in the markets where finance is conventional (about 0.016 in the U.S and 0.01 in France and United Kingdom) in relation to those where finance is Islamic (about 0.004).

– We also note that the shock on the DOW JONES is transmitted negatively on all other markets but with a different extent. In France, we observe a continuous decrease of the SBF250, which becomes negative after two periods and a half. This last reaches its minimum on the level of the 3rd period (- 0,003). A

– reversal of the trend is also noted. Indeed, it reaches a positive sign but very weak on the fourth period and then decreases again to have a negative sign during the fifth period. In the U.S and United Kingdom, almost the same trend was observed. Indeed, we notice a continuous reduction of the index which reaches its minimum at the end of the 2nd period (- 0,004), then it increases while remaining negative before the effect of the shock fades. On the other hand, in Saudi Arabia and Indonesia, we note, at the beginning, a positive effect during the first two periods, and then the indexes start to decrease gradually to reach a minimum during the fourth period of about -0.0001.

In the light of this work, it is clear that the current financial crisis was transmitted negatively on all the markets. This effect is of weak extent in the markets where finance is Islamic. Consequently, Islamic finance can constitute an effective additional financing system beside conventional finance in the Western countries in order to reduce the effect of crisis.

V. Conclusion

The purpose of this paper is to highlight the benefits of Islamic finance. Theoretically, several studies have shown that this type of financing can reduce the effect of crisis. In order to illustrate this report empirically, we used an econometric model, specially a VAR model for the case of the financial markets of the United States, France, Saudi Arabia and Indonesia. The results show that the transmission of the current crisis is weak in the markets which are used Islamic finance. Indeed, regarding the extent of the effect, we noted that the reduction in indexes is more important in the United States, United Kingdom and in France compared to those in Saudi Arabia and in Indonesia. So, the negative effect of the shock is more important in the markets where finance is only conventional.

Unlike conventional finance which is periodically hit by crisis of varying severity, Islamic finance can be regarded as a stable and efficient financial system to absorb shocks, and able to promote growth and job creation. Nevertheless, juridical and fiscal adjustments are necessary to accelerate its development.

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Annexe 1 : Resultats of the Estimation

Vector Autoregression Estimates
Date: 12/23/10   Time: 01:03
Sample (adjusted): 3/01/2007 12/20/2010
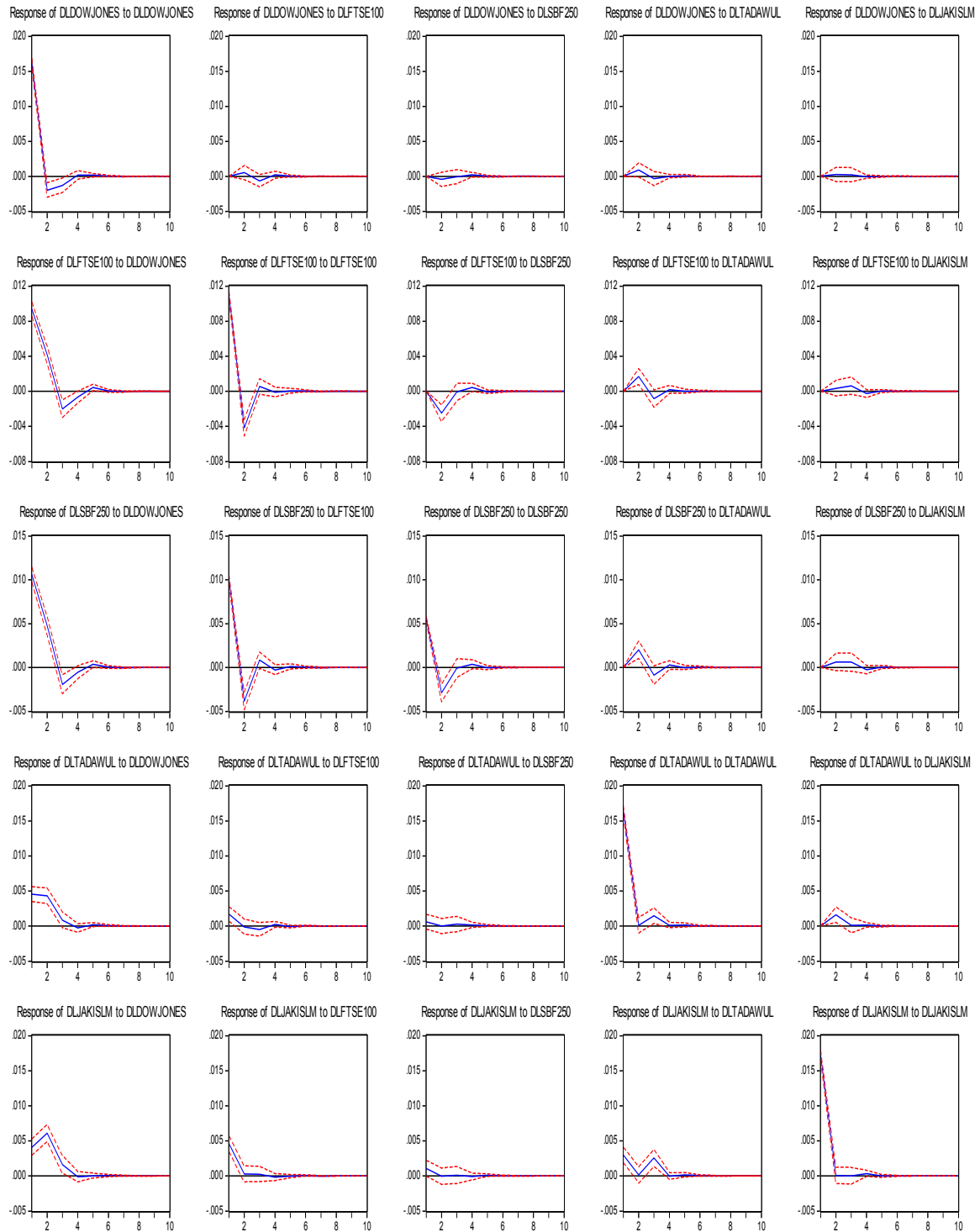Included observations: 993 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DLDOW JONES	DLFTSE100	DLSBF250	DLTADAWUL	DLJAKISLM
DLDOW JONES(-1)	-0.148853	0.519027	0.544000	0.276393	0.364000
	(0.04318)	(0.03872)	(0.04185)	(0.04608)	(0.04970)
	[-3.44706]	[13.4038]	[12.9990]	[5.99826]	[7.32386]
DLDOW JONES(-2)	-0.091502	0.142940	0.120939	0.091765	0.097132
	(0.04702)	(0.04217)	(0.04557)	(0.05018)	(0.05412)
	[-1.94590]	[3.38992]	[2.65384]	[1.82884]	[1.79472]
DLFTSE100(-1)	0.113512	0.022698	0.114505	-0.030402	0.031942
	(0.09633)	(0.08638)	(0.09335)	(0.10279)	(0.11086)
	[1.17843]	[0.26278]	[1.22660]	[-0.29578]	[0.28812]
DLFTSE100(-2)	-0.025864	0.055234	0.084359	-0.130977	-0.046435
	(0.09534)	(0.08550)	(0.09240)	(0.10174)	(0.10974)
	[-0.27127]	[0.64603]	[0.91297]	[-1.28739]	[-0.42316]
DLSBF250(-1)	-0.088724	-0.466164	-0.543301	-0.018773	-0.009799
	(0.09273)	(0.08315)	(0.08987)	(0.09895)	(0.10672)
	[-0.95682]	[-5.60624]	[-6.04569]	[-0.18973]	[-0.09182]
DLSBF250(-2)	-0.019746	-0.210387	-0.206308	0.043653	0.046474
	(0.09303)	(0.08342)	(0.09015)	(0.09927)	(0.10707)
	[-0.21226]	[-2.52208]	[-2.28839]	[0.43976]	[0.43406]
DLTADAWUL(-1)	0.051075	0.099567	0.115901	-0.011522	0.007355
	(0.03153)	(0.02827)	(0.03055)	(0.03364)	(0.03628)
	[1.62011]	[3.52210]	[3.79355]	[-0.34252]	[0.20270]
DLTADAWUL(-2)	-0.016791	-0.030734	-0.034737	0.079228	0.134818
	(0.03120)	(0.02798)	(0.03024)	(0.03330)	(0.03591)
	[-0.53812]	[-1.09843]	[-1.14873]	[2.37953]	[3.75403]
DLJAKISLM(-1)	0.015178	0.020149	0.035754	0.093866	0.004011
	(0.02946)	(0.02641)	(0.02855)	(0.03143)	(0.03390)
	[0.51528]	[0.76281]	[1.25244]	[2.98632]	[0.11829]
DLJAKISLM(-2)	0.010594	0.035548	0.033224	0.002630	-0.005056
	(0.02881)	(0.02583)	(0.02792)	(0.03074)	(0.03316)
	[0.36772]	[1.37600]	[1.18997]	[0.08554]	[-0.15248]
C	-0.000106	-0.000252	-0.000552	-0.000246	0.000632

	(0.00051) [-0.20580]	(0.00046) [-0.54662]	(0.00050) [-1.10829]	(0.00055) [-0.44886]	(0.00059) [1.06849]
R-squared	0.028831	0.194505	0.188270	0.076940	0.120310
Adj. R-squared	0.018941	0.186303	0.180004	0.067540	0.111351
Sum sq. resids	0.254977	0.205026	0.239477	0.290326	0.337759
S.E. equation	0.016114	0.014449	0.015616	0.017194	0.018546
F-statistic	2.915256	23.71268	22.77622	8.185298	13.43017
Log likelihood	2695.715	2803.970	2726.854	2631.253	2556.119
Akaike AIC	-5.407281	-5.625317	-5.469997	-5.277449	-5.126122
Schwarz SC	-5.352993	-5.571029	-5.415709	-5.223161	-5.071834
Mean dependent	-5.31E-05	-4.67E-05	-0.000326	-0.000229	0.000557
S.D. dependent	0.016268	0.016018	0.017245	0.017806	0.019674

Determinant resid covariance (dof adj.)	7.73E-20
Determinant resid covariance	7.31E-20
Log likelihood	14832.00
Akaike information criterion	-29.76233
Schwarz criterion	-29.49089

Annexe 2 : Results Response Functions.

Response to Cholesky One S.D. Innovations ± 2 S.E.

Annexe 1: Model validation

DLDOWJONES Residuals

DLFTSE100 Residuals

DLSBF250 Residuals

DLTADAWUL Residuals

DLJAKISLM Residuals