ISLAMIC ECONOMIC STUDIES

Vol. 20 No. 1 Rajab 1433H (June 2012)

ARTICLES

ISLAMIC RESEARCH AND TRAINING INSTITUTE
A Member of Islamic Development Bank Group

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Islamic Research & Training Institute (IRTI)

Establishment

The Islamic Research and Training Institute (IRTI) was established by the Board of Executive Directors (BED) of the Islamic Development Bank (IDB) in conformity with paragraph (a) of the Resolution No. BG/14-99 of the Board of Governors adopted at its Third Annual Meeting held on 10th Rabi-ul-Thani, 1399H corresponding to 14th March, 1979. The Institute became operational in 1403H corresponding to 1983. The Statute of the IRTI was modified in accordance with the resolutions of the IDB BED No.247 held on 27/08/1428H.

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The Institute undertakes research for enabling the economic, financial and banking activities in Muslim countries to conform to Sharīʿah, and to extend training facilities for personnel engaged in development activities in the Bank's member countries.

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The functions of the institute are to:

A. Develop dynamic and innovative Islamic Financial Services Industry (IFSI).
B. Develop and coordinate basic and applied research for the application of Sharīʿah in economics, banking and finance.
C. Conduct policy dialogue with member countries.
D. Provide advisory services in Islamic economics, banking and finance.
E. Disseminate IFSI related knowledge through conference, seminars, workshops, apprenticeships, and policy & research papers.
F. Provide learning and training opportunities for personnel engaged in socio-economic development activities in member countries.
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H. Collaborate to provide policy advice and advisory services on the development and stability of Islamic Finance and on the role of Islamic institutions in economic development to member government, private sector and the NGO sector.
I. Develop partnership with research and academic institutions at OIC and international levels.

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Research & Advisory Services Department	Training & Information Services Department
Islamic Economics & Finance Research Division	Training Division
Advisory Services in Islamic Economics & Finance Division	Information & Knowledge Services Division

Headquarters

The Institute is located at the headquarters of the Islamic Development Bank in Jeddah, Saudi Arabia.

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Islamic Banking in the Middle-East and North-Africa (MENA) Region

SALMAN SYED ALI[1]

Abstract

Islamic finance has now become an important element in the development agenda of the Middle East and North African (MENA) countries. It is also gaining significance in the financial landscape of the region as well as of the individual countries. As a growing business it caters to the financial needs of the people without conflicting with their social and religious values. Despite this reality, little systematic and consistent analysis exists in the literature on the asset and liability structure of Islamic banks in the region and across individual countries. Even lesser is known on what drives Islamic banking growth.

This paper addresses this gap and explores how the structure of the Islamic banking sector has been evolving in the MENA region in recent years, and how it is growing in terms of assets, liabilities, financing and funding structures within the region and across different countries. It also provides an exploratory analysis of relative importance of the various factors responsible for the growth of Islamic banking in the region. The financial crisis provided us with a natural experiment to evaluate the contribution of Islamic banking towards resilience and inclusiveness of financial sector by analyzing the performance of these banks during this period.

This paper was prepared for World Bank MENA Region Flagship Finance Report and has also been issued earlier by World Bank MENA Region Office and can also be accessed from this link: http://siteresources.worldbank.org/INTMNAREGTOPPOVRED/Resources/MENAFlagshipIslamicFinance2_24_11.pdf

[1] I am grateful to Abdirahman Hasan Sheikh and Azzam Aijazi for their able research assistance and to IBIS staff for making the data available. I am also thankful to Ms. Zsofia Arvai and Zamir Iqbal of World Bank for helpful comments. Zsofia Arvai also provided data on the conventional banks.

1. Introduction

Islamic finance in the Middle East and North African (MENA) countries has now become an important element in their societies' development agendas and it is also gaining ground in the financial landscape of the region as well as in the individual countries. It is also a growing business as it caters to the financial needs of the people without conflicting with their social and religious values. Despite this reality, little systematic and consistent analysis exists in the literature on the asset and liability structure of Islamic banks in the region and across different countries. Even lesser is known on what drives Islamic banking growth. Except for some sweeping statements that appear in popular press no systematic analysis of the driving factors exist to our knowledge. Similarly, what has been the contribution of Islamic banking to the financial sector in terms of resilience and access are unexplored questions.

This paper explores these issues. In particular it sheds light on how the structure of Islamic banking sector has evolved in the MENA region in recent years. How it is growing in terms of assets, liabilities, financing and funding structures in the region and across different countries. It also provides an exploratory analysis of relative importance of various possible factors responsible for the growth of Islamic banking in the region. The financial crisis provided us with a natural experiment to evaluate the contribution of Islamic banking towards resilience and inclusiveness of financial sector by analyzing the performance of these banks during this period.

The Islamic banks were among the first categories of financial institutions that emerged in Islamic financial services industry. As this industry expanded, and as the conventional financial sector in MENA countries diversified into capital markets and other segments, many other non-banking financial institutions and services also emerged in Islamic finance. Now Islamic financial services industry not only comprises of Islamic banks but also includes investment and mutual funds, project finance companies, and *takāful* institutions. New instruments of financing and capital market products have also emerged. This study however focuses on Islamic banking segment only.

2. Nature and Model of Islamic Banking

Financial intermediation is an important activity for the smooth functioning and growth of the economic sector. Collection of savings from various economic agents

and channeling them for investment is information intensive activity. It requires institutions that on one hand can provide incentives to the savers to pool resources with them and on the other hand specialize in information processing and monitoring to evaluate fund-seekers and their investment opportunities to allocate the funds in the best possible way so as to earn income for themselves. In the conventional banking these two activities of collection of funds and then their disbursement are done on the basis of interest charge. That is, the bank charges an interest amount from the financed party and pays a slightly lesser interest amount to the funding party with the differential interest margin gained for itself.

Interest is prohibited in Islam. Therefore conventional banking is not the right arrangement for financial intermediation in an Islamic economy. Islam also gives a higher role to moral values and promotes justice in all aspects including finance. Hence Islamic economy requires other institutional arrangements that are conducive to the objectives of Islamic law. Banking without interest is one of the hallmarks of Islamic banking system.[2] In this system, the incentives to the financing institutions for rendering their financing services are provided in the form of sharing in the profits of the financed enterprise; in the form of earning profits by engaging in trade or supplying of the intermediate goods and services to other businesses; and in the form of fee in return for various payments services and investment services etc. On the funding side too, the Islamic banks do not obtain funds on interest based contracts. Rather, they share their profits with their investment account depositors hence providing incentives to the savers to use the banking system. These banks also provide deposit, safekeeping and payments services thus attracting current deposits which do not pay any remuneration to its depositors. In short, Islamic banks do not work simply as pure intermediaries of financial capital but get more involved with the activities of the users of funds. In this sense they are closer to universal banks.

An initial simple model of Islamic banking that was proposed in 1960s was a two tier *muḍārabah* arrangement.[3] Whereby the bank collects funds on the basis of agency relationship from savers/depositors and invests them as their agent on the condition that the bank will get a pre-agreed proportion of profit from this investment. This agency agreement in return for a defined proportion of share in profit is called a *muḍārabah* arrangement that the bank has on its funding side with

[2] Other features of Islamic banking include avoidance of un-necessary uncertainty, attention to moral values and wellbeing of society.

[3] Initial full model appears in Siddiqi's book published in 1966 in Urdu language entitled *"Bila Soodi Bankari"*. This was translated and published in English as Siddiqi (1986).

the savers/depositors. In order to invest the funds that have been pooled from the savers/depositors and earn a return for them the bank uses a second tier of *muḍārabah* arrangement, this time it is between the bank and the financed party. Whereby, the financed party utilizes the funds in its commercial enterprise and agrees to share with the bank a proportion of the profit. This is the two tier *muḍārabah* model. It has the advantage that liability side fully adjusts to fluctuation in the asset side, bank solvency is not an issue, and a broader level of risk sharing is achieved in the society. Risk sharing at all levels of business enterprise leads to lower levels of premature bankruptcies of business, and rarer event of sudden closure of banks. These characteristics have very positive implications for the financial as well as economic stability.

However, this is not the most practicable model for every situation. For example, it has high informational requirements for calculation and verification of revenues, costs and hence profit or loss. The existence of information asymmetry between the contracting parties gives rise to the problems of moral hazard and adverse selection which may result in no contract if these costs are high. Similarly, there may be informational externalities because of which one party may not be willing to reveal a piece of information that is vital for the agency contract to hold between the two parties. Hence, agency may not remain suitable. A less information intensive contract in such situations is *murābaḥah* contract. Whereby, the bank buys, from spot market and in its own name, the plant or the equipment or the raw material that is needed by the entrepreneur and then sells it to him on deferred payment with a marked up price.

This gave rise to a second model of Islamic banking. In this model, which is more prevalent in practice, the funding side of the bank is on *muḍārabah* (agency contract) with savers/depositors but on the financing side the bank uses both *muḍārabah* (agency contract) and *murābaḥah* (marked up price sale contract) as and when appropriate. Thus this model is applicable for wider set of activities, hence when proportions of both types of financing are high it retains the stability feature and adds accessibility. In addition to *muḍārabah* (profit sharing) and *murābaḥah* (fixed return) contracts, *ijārah* (leasing) and other contracts are also used by Islamic banks on their financing side which further adds to menu of choices and applications. Further details of asset and liability sides of Islamic banks will be discussed in coming sections.

An important point to note in all models of Islamic banking, and also for Islamic finance in general, is that finance is always tied to real economic activity or investment. There is no untied credit that earns a return. Income earning credit

comes into being only by value adding real economic transaction be it in the form of *murābaḥah* or leasing or other such contracts. This in itself is a source of stability for the overall financial system. Moreover, the profit sharing that takes place between individual bank and savers/depositors works to stabilize the bank, increase its monitoring, and in turn have positive systemic stability implications as well.

2.1. Major Islamic Banking Business Models

The theoretical model of Islamic banking is closer to the universal banking model, whereby the bank is not restricted to the business of extending credit only but it also gets actively involved in trading and owning the shares in other businesses. Given the nature of Islamic finance the strict segregation of banking business into commercial banking and investment banking is not an optimal arrangement. However, due to the existing regulatory setup as well as based on the diverse organizational arrangements of the financial sectors across countries, we find various business models of Islamic banks have emerged. Following are some major business models used in Islamic banking:

1. Retail and Corporate Banking
2. Investment Banking
3. Combination of Commercial and Investment Banking
4. Bank working as Money Changing and Money Transferring Business
5. Investment Company Models
6. Holding Company – holding various financial companies
7. Banks operating mutual funds (i.e., indirect investment companies)
8. Industrial and financial conglomerates
9. Specialized Banks (catering to specific sectors as agriculture only or industry only)

In the MENA region majority of Islamic banks are in private sector. They exist along with the conventional banking and financial institutions with the exception of Iran which classifies all its banks as Islamic and majority of them are state owned. Among the MENA countries, most developed Islamic banking sectors are found in Bahrain, Kuwait, Qatar, Saudi Arabia and United Arab Emirates. The nature of funding and operations of Islamic banks are somewhat different from that of conventional banks. In these countries Islamic banks raise depositor funds mainly under three categories:

(i) Demand Deposits do not give any returns to the depositor and can be withdrawn by the depositor at any time. For these deposits the relationship between the bank and the depositor is that of debtor and creditor. Thus the amounts in this category of deposits are a liability in the accounting books of the bank. Safekeeping and payments facilitation are the primary motives of the individuals and businesses in keeping such accounts with the banks. Thus these deposits are similar to current accounts in conventional banking system.

(ii) Unrestricted Investment Accounts raise funds which are utilized by the bank in its general investment and financing activities based on their own judgment, and the profits or losses from the overall business of the bank are shared between the bank and the holders of such account. The account holders do not have a voice in instructing the banks on how, where, and for what period to invest. Except that the investment avenues and methods should not be against Sharīʿah – a fiduciary responsibility of Islamic banks. Thus the contractual relationship between the bank and the depositor in this account is that of unrestricted *muḍārabah*, with bank acting as *muḍārib*. Moreover, the account holders are also allowed to withdraw their funds any time; however such early withdrawal will reduce the proportion of profit share that they will get. This combination of non-voting equity like features (i.e., sharing in profit and losses by depositors and free hand to bank in investment decisions) with debt like feature (i.e., possibility of withdrawal) makes these accounts like quasi equity. This also gives rise to a corporate governance issue that how to keep investment risk and return preference of the bank aligned to that of the unrestricted account holders.

(iii) Restricted Investment Accounts (also called special investment accounts) raise funds which are invested by the bank only in the specific projects and sectors pre-agreed between the account holders and the bank. Bank shares in profits from the specific investments with these account holders who are expected to keep the investment account up to the end of its maturity. The contractual relationship between the depositor and the bank is that of restricted *muḍārabah*. Given these features, these accounts are not liabilities of the bank, rather a kind of equity contribution to the bank but with a proviso that the shareholders do not have full voting rights. This last feature gives rise to corporate governance issue of how to protect the interests of the depositors or how to keep the investment and risk preference of the bank and the depositors in alignment with each other. The closest counterparts of such arrangement in conventional finance are

collective investment schemes or the closed end mutual funds. The issues of governance, disclosure and protection that arise therein are also relevant here. The specificity of investment avenues and restriction on premature withdrawal of funds create higher risk for the depositors in restricted investment accounts but such investments can also bring higher returns. Generally the minimum investment requirements in these accounts are higher than that in unrestricted investment accounts and these are offered for wealthy or sophisticated investors.

The unrestricted and restricted investment accounts constitute one of the distinguishing funding arrangements between present-day Islamic and conventional banking. The amounts thus raised constitute limited-term, non-voting equity closer to trust funds. The Accounting Standards issued by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) therefore classifies unrestricted investment accounts as a separate entry between liabilities and owners' equity on the balance sheet of Islamic banks. Whereas it treats restricted investment accounts as separate off-balance sheet item.[4] Only the banks in jurisdictions which follow AAOIFI standards (Bahrain in MENA) report data in this way. Banks in other countries of MENA region report all deposits on their balance sheet.[5]

The financing operations of these banks comprise of two main types:

(i) Banking operations (i.e., financing, trading, as well as investments) initiated by the demand of the clients needing finance.

(ii) Investment operations (i.e., trading, direct and indirect investments) initiated by the bank itself to gain from the available trading and investment opportunities.

Both categories of the operations will increase the profit for the bank as well as for its stake holders, i.e., the shareholders as well as the restricted and unrestricted investment account holders. As can be seen, the above classification of activities is different from the one used in conventional banking i.e., banking book (financing only) and trading book (portfolio only) transactions.

[4] See Statement of Financial Accounting No. 2 and Financial Accounting Standard No. 1 in AAOIFI (2008) *Accounting, Auditing and Governance Standards for Islamic Financial Institutions 1429H – 2008.*

[5] To make our empirical analysis consistent across different reporting methods followed in different countries we have treated all kinds of deposits as items on the balance sheet.

For the analysis of Islamic banking data in the MENA region we selected a sample of 30 banks. The sample is well representative of the banking sector in the region, excluding Iran. It consists of those financial institutions that are classified as banks, i.e., those which accept deposits from customers or thus defined by the respective national central banks. These include retail as well as investment banks, but exclude investment companies, mutual funds and the likes. For the detailed balance sheet data we relied on IBIS (Islamic Banks Information System) which has been developed and made available on-line by Islamic Research and Training Institute (IRTI).[6] Our unit of analysis is average bank in each of the selected countries.

3. Major Items on the Assets Side of the Balance Sheet:

For our data set we relied on IBIS as explained above. In IBIS the major items of assets side of the banks' balance sheet are classified as (i) Cash and its Equivalents, (ii) Financing extended using Islamic Modes of Finance, (iii) Portfolio Investment, and (iv) Total Investment.

The details of the breakdown of each major item are given in Table 1. The item (i), cash and its equivalents is obvious. The difference between items (ii) and (iii) above is that the item (ii) represents output of the bank in extending finance to other businesses, individuals and organizations. Whereas, the item (iii) represents portfolio investments in securities (*ṣukūk* and shares), direct investment in companies, and real estate all that is in the nature of treasury operations and investment holding.

Banks are businesses that cater to the needs of their clients as well as they are the guardians of the wealth of their share holders and of their various account holders. Financing operations are initiated in response to the demands of clients with a view to maximize profits for the bank. The investment operations are primarily bank initiated and utilize the available investment opportunities. Both financing (item ii) and investment (item iii) may involve ownership of the real asset by the bank.

[6] IBIS Islamic Banks Information System is an online database as well as information and research network that can be accessed from its website http://www.ibisonline.net. The database uses published annual reports as primary source of data for individual banks augmented by its own questionnaire survey to present data in consistent way across banks and countries.

Table-1
Assets – Breakdown of Major Items

Major Items	Constituents
i. Cash and Its Equivalents	Cash in vaults Cash with central bank Balances with banks and other institutions Cash equivalents
ii. Financing using Islamic Modes	*Al-Qarḍ Al-Ḥasan* *Murābaḥah* & deferred sales Leasing and hire purchase *Muḍārabah* *Mushārakah* *Salam* *Istiṣnāʿ* Others Less provisions
iii. Portfolio Investment	Investment in companies, funds, shares Investment in bonds, bills, securities Investment in properties & real estate Other investments Less provisions
iv. Total Investments (ii + iii)	Prepaid expenses & other receivables (net)
	Fixed assets net of depreciation Other assets (net)
Total Assets	

The analysis in this section is based on a sample of 30 Islamic banks (see Table 2) covering 9 countries of the MENA that have significant Islamic financial institutions. The data covers three years 2006, 2007, 2008.

Table-2
Sample Distribution Across Countries

Country	Banks in the Sample
Bahrain	12
Egypt	2
Jordan	2
Kuwait	2
Lebanon	1
Qatar	2
Saudi Arabia	3
UAE	5
Yemen	1
MENA Region	30
SAMPLE YEARS: 2006, 2007, 2008 The number and identity of banks remain same across years.	

3.1. Highlights of the Asset Size and Growth

The Islamic banking assets in the MENA region have been growing exponentially over the last several years. For example, in 2004 the proportion of Islamic banking assets of the Middle Eastern banks was only about 29 percent of the worldwide Islamic banking assets, which grew to 50 percent of the world wide share in 2008.[7] Not only the aggregate but the average asset per bank also has increased in the Middle East. Most of this growth was taking place in the GCC countries but recently the non-GCC countries are also witnessing growth of Islamic

[7] This is based on calculations using IBIS data for the year 2004 and 2008. The data in IBIS is based on published annual reports of the banks. In these annual reports each bank's assets and liabilities are measured as per policy of that bank's regulator which forms the basis of financial reporting by the bank. The general accounting practice is to classify measurement of financial assets into two categories: those that are measured at fair value, those that are measured at amortized cost. The classification is made at the initial recognition of asset and depends on the business model of the financial entity. Debt like instruments or where the objective is only to collect the cash flows are measured at amortized cost. Equity type instruments are measured at fair value.

banking both by coming up of domestically incorporated Islamic banks and also by cross border expansion of GCC based Islamic banks through their subsidiaries.[8]

Key factors behind this high growth have not been fully explored. Increasing demand for Islamic system along with the opportunities for its expression in Islamic finance, successful track record of Islamic banks which increased public's trust in them, and economic growth in the region all may have contributed to the sustained development of Islamic finance over the years. However in the recent past, the outflow of funds from the US banks and financial markets to the Middle East and elsewhere after the hostile and uncertain environment created by the US government policies in the wake of September 11 incident; rising oil prices during 2004 to 2007 resulting in higher investable surplus; and the booming real estate market in many GCC countries during the same period all may have enhanced the growth of financial sector and Islamic banking in the MENA region.[9]

This growth however slightly slowed down in 2008 compared to 2007. For our sample of 30 banks of the MENA region the total assets were 196,569 billion US dollars in 2008. This was only 24 percent higher from the previous year compared to a 34 percent increase in 2007. Analyzing the composition of asset structure, the component of financing in the asset structure of Islamic banks has always been largest proportion followed by that of portfolio investment and cash equivalent components. During 2008, for the overall MENA region these components comprised of 65 percent, 16 percent and 15 percent respectively. Between the period 2006 and 2007 the total assets grew at a rate of 34 percent which slowed down to 24 percent in 2007-2008. The reduction in asset growth rate between the two periods was mainly in two components of asset side, namely portfolio investments and cash equivalents whose growth rates came down substantially. Whereas the financing component of asset side saw a substantial rise in the growth rate from 33 percent a year before to 45 percent in 2007-2008.

Islamic banking sector is not of similar size and scope across MENA countries. Figure 1 shows the asset size distribution for various countries while Table 3 gives asset growth rates from 2006 to 2007 and from 2007 to 2008. The assets have been growing in all countries with the highest growth shown by Qatar of 48 percent and lowest by Egypt of 10 percent. Lebanon with an asset growth of 145 percent is an

[8] Islamic banks were started in Syria, and forthcoming in Libya, Tunis, and Morocco.

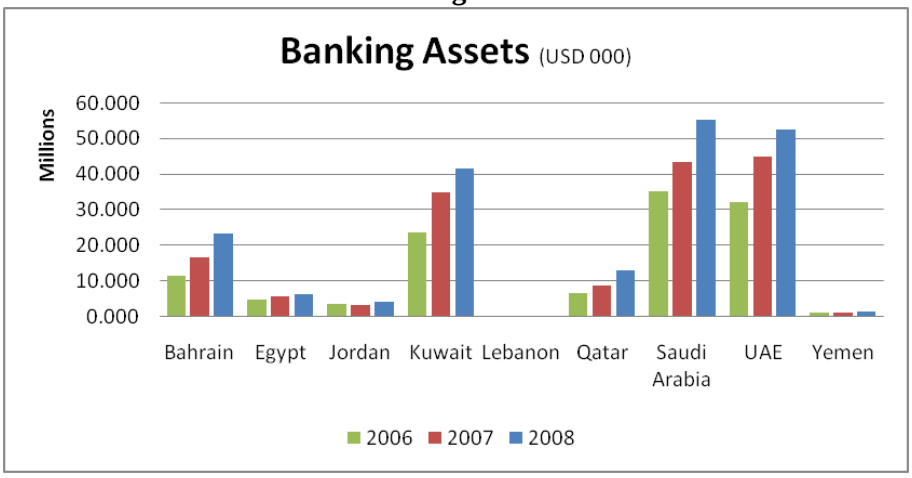
[9] For example, during the period of 2002 to 2008 the Islamic banking assets experienced an average growth rate of 72 percent per year. This is in contrast to a figure of 56 percent average per annum growth of Islamic banking assets worldwide.

exception as Islamic banks opened in the country only in 2006 and it is starting from a very small base. Saudi Arabia, UAE and Kuwait stand out as giants in terms of aggregate assets of Islamic banks while Egypt, Jordan, Yemen, and Lebanon constitute the lower tail with Qatar and Bahrain in between (see Figure 1).

Table-3
Growth Rates of Assets and Deposits across Countries

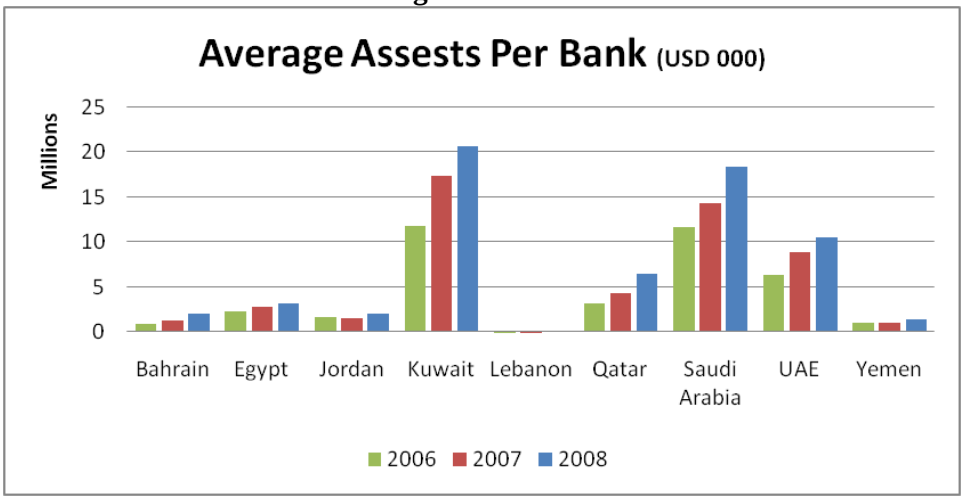
		ASSETS GROWTH RATE (%)		CUSTOMER DEPOSITS GROWTH RATE (%)	
COUNTRY	BANKS IN SAMPLE	2006-07	2007-08	2006-07	2007-08
Bahrain	12	48.54	39.00	58.33	32.07
Egypt	2	21.27	10.53	22.89	9.54
Jordan	2	(9.30)	25.86	(8.59)	16.34
Kuwait	2	47.04	19.33	51.05	24.94
Lebanon	1	362.09	145.54	(3.02)	21.43
Qatar	2	34.64	47.94	26.63	31.98
Saudi Arabia	3	23.16	27.94	28.65	22.32
UAE	5	40.28	17.07	46.16	19.56
Yemen	1	7.29	20.08	6.13	18.73
MENA Region	30	34.50	24.50	37.47	22.28

Figure-1
Banking Assets



The above chart shows aggregate assets of 30 Islamic banks (our sample) distributed by countries and for each year 2006, 2007 and 2008. The number of sampled banks in each country varies but remains constant across years. The sample distribution is described in Table 2.

Figure-2
Average Assets Per Bank



The above chart shows average assets of Islamic banks (in our sample) in each country for each year 2006, 2007 and 2008. That is, aggregate assets of sampled Islamic banks in each country divided by number of banks sampled from that country. The process is repeated for each sample year. The sample distribution is described in Table 2.

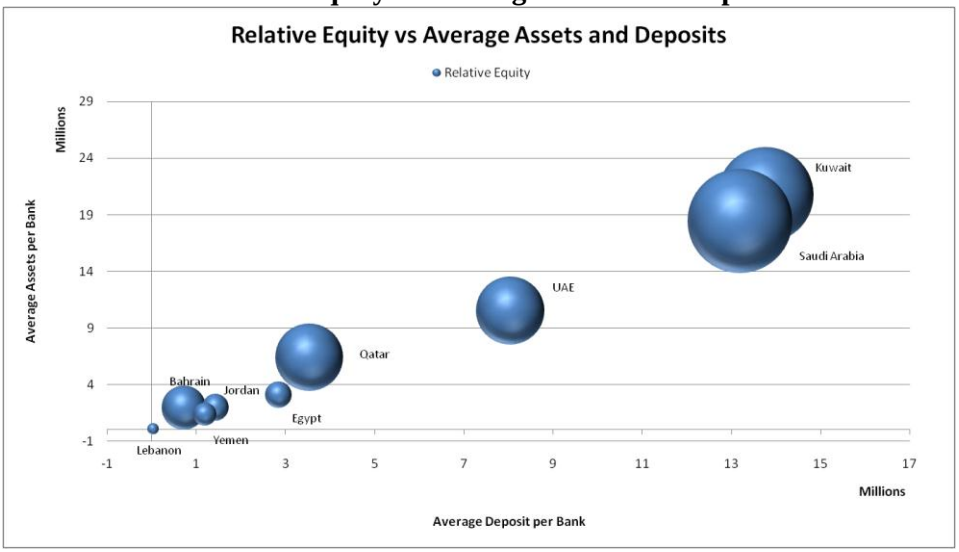
These aggregate figures however do not reveal the average size of Islamic banks and the level of concentration. Figure 2 shows average assets of Islamic banks in each country for each year from 2006 to 2008. It reveals that the average assets have been growing throughout this period in all the sampled countries in the MENA region. It also reveals that the average size of Islamic banks (by asset) have been largest in Kuwait, followed by Saudi Arabia, UAE, Qatar, Egypt, Jordan, Bahrain, Yemen, and Lebanon respectively. In fact the size of Islamic banks in MENA region has been growing for the past many years. In our sample the average asset of Islamic banks in 2008 came out to be USD 6635 million per bank which is nine times larger than the average bank size of USD 727 million in 1996 in the Middle East.[10]

Figure 3 shows average asset size (along y-axis) and customer funds per Islamic bank (along x-axis) in millions of US dollars for each of the 9 selected counties for the year 2008. The same figure also shows relative equity per bank (by size of the bubble) in each country compared to the sum of average equity per bank for the entire region.[11] It reveals the fact that on the average the banks in Saudi Arabia and Kuwait have larger asset size and larger customer deposit base along with very high equity compared to the banks in rest of the MENA countries making them potentially more stable. It also shows that Bahrain, a country with relatively well developed Islamic financial sector, is in the same league as Jordan and Yemen in terms of average banking assets and deposit base. However, these lower averages for Bahrain are because of more competition and larger number of Islamic banks there than in any other country. Despite this competition, the relative equity of the banks in Bahrain is larger than the banks in Jordan, Yemen and even those of Egypt. The banks in Kuwait and UAE lie in between, in terms of average assets and average deposit base, among the range of 9 countries under consideration with UAE on a higher side than Kuwait. However, in terms of relative equity the banks in these two countries are quite similar having moderately high equity.

[10] The average assets of Islamic banks in the Middle East have been calculated using data from Table-1 and Table-2 of Iqbal et al (1998). The comparison is in terms of nominal US Dollar values.

[11] Relative equity per bank for a country = average Islamic bank equity in that country / the sum of average equity in all countries of MENA region.

Figure-3
Relative Equity vs. Average Assets and Deposits



The above chart compares three variables for each country for the year 2008. (i) Along x-axis: Average deposits of Islamic banks (in our sample) in each country. (ii) Along y-axis: Average assets of Islamic banks (in our sample) in each country. (iii) Equity per bank in each country relative to the sum of average equity for all countries in the MENA region (relative equity is represented by the size of the balls in the chart).

3.2. Asset Composition

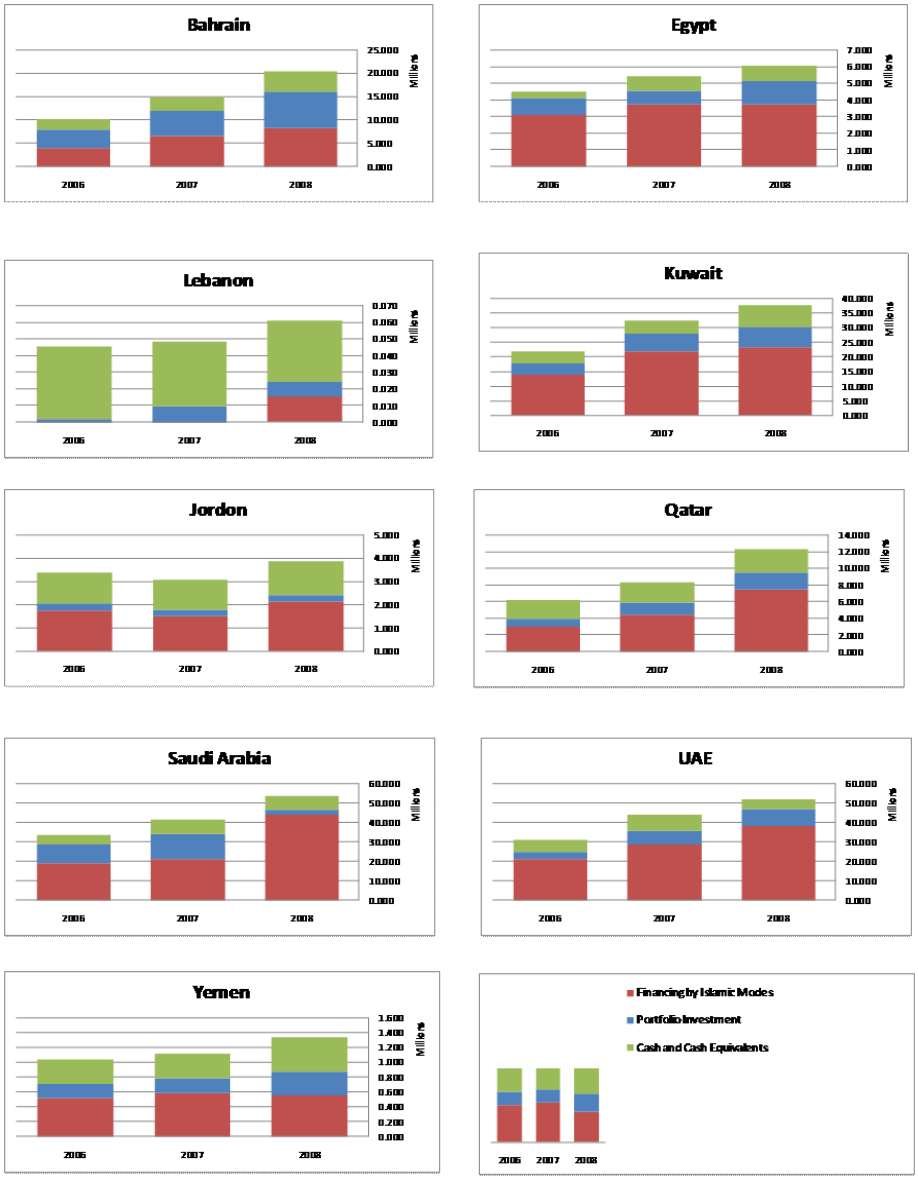
Total assets can be decomposed into the three categories of (i) Cash and its Equivalents; (ii) Financing extended using Islamic Modes of Finance; and (iii) Portfolio Investment which have been described in the earlier section. Figure 4 shows asset composition of Islamic banks (aggregated for each country) by these three categories for each of the nine countries for each year over 2006, 2007, and 2008. Several interesting facts can be gleaned from this figure. First, that in most countries the financing proportion of asset was larger than portfolio investment followed by cash and cash-equivalent assets. Second, while assets increased in all countries the asset composition did not change in similar ways across each country and across each year. Thus the sources and therefore the causes of asset growth were not homogenous across countries. In Saudi Arabia the financing component expanded fast from 2007 to 2008 (showing expansion in credit) while portfolio investment declined significantly. The decline in portfolio investment by banks may be due to subdued financial markets. In UAE, all the three components of assets increased proportionally between 2006 and 2007. However, in 2008 the

financing component of total assets increased faster than portfolio investment while cash and cash-equivalent component in fact declined signifying expansion in credit and strained liquidity situation. Bahrain, Kuwait and Qatar showed proportional growth of all components of assets; however the expansion in total assets in Qatar was much faster. Lebanon is an outlier case in our analysis. As the only Islamic bank there is new, majority of its assets were in liquid form in 2006 which gradually increased and diversified into other asset categories by 2008.

Further analysis of the financing component of assets shows that while a variety of Islamic financing modes are used by the banks and the composition of their use vary across countries, *murābaḥah* financing is the dominant mode used by Islamic banks in all countries of MENA region. In some countries *murābaḥah* constitutes more than 90 percent of financing in others it is just less than 50 percent. On the average, for overall MENA region, the proportion of *murābaḥah* in total financing is 75 percent. Leasing (or hire-purchase) is the second most used mode in Bahrain, Jordan, Kuwait, Lebanon, and Qatar.

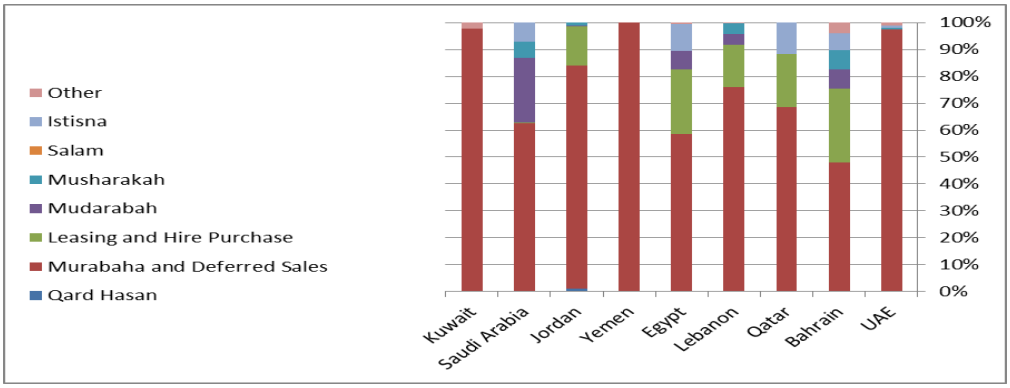
Muḍārabah financing is the second largest mode in Saudi Arabia but of lesser importance in other countries. *Istiṣnāʿ* is third most used mode in MENA region countries. *Al-Qarḍ Al-Ḥasan* (or zero returns benevolent loan) in any significant amount is used only in Jordan. Figure 5 gives use composition of various modes of financing across different countries for the year 2008.

Figure-4
Asset Composition of Islamic Banks in Selected Countries



The above chart shows asset composition of Islamic banking sector in nine countries (using the sample of 30 banks) and provides a comparison for the years 2006, 2007 and 2008.

Figure-5
Composition of Financing Modes in Islamic Banking Sectors, 2008



The above chart shows the percentage composition of various modes of financing across different countries for the year 2008.

4. Major Items on the Liability Side of the Balance Sheet

Major items on the liabilities side include (i) customer funds comprising of various kinds of deposits; (ii) funds due to other creditors; and (iii) other liabilities. A definitional breakdown of these items is given in Table 4. A country-wise composition of the major items in 2008 is given in Figure 6. This comparison indicates that in each of these countries the bulk of liabilities comprised of customer funds (or customer deposits).

Further analysis of customer funds is also possible. In an earlier section we have explained how the liability side of Islamic banks is different from conventional banks. There we identified three types of customer accounts: demand deposits that do not pay any return; unrestricted investment accounts, and restricted investment accounts that share in profits. However, Islamic banks in many jurisdictions, except those in the jurisdictions that follow AAOIFI accounting standards, report the data in a manner that does not permit a clear distinction between restricted and unrestricted investment accounts. Nevertheless a distinction is possible between demand deposits, profit sharing short-term *muḍārabah* investment accounts (these are nearer to unrestricted investment accounts) and profit sharing *muḍārabah* savings investment accounts (which are longer term and nearer to restricted investment accounts). The largest portion of customer accounts comprise of short-term *muḍārabah* investment account that is followed by non-remunerative demand deposits. For example, of the total customer funds of USD131.4 billion held in

customer accounts by Islamic banks in the MENA region in 2008, USD41.96 billion (31.9%) were in non-remunerative current and savings accounts (i.e., not sharing in profits); USD 63.35 billion (48.2%) in *muḍārabah* investment accounts; USD8.1 billion (6.2%) in *muḍārabah* savings accounts; and USD17.9 billion (13.6%) in other customer accounts. Figure 7 shows that the first two categories of accounts had been growing fast in the MENA region over the last three years. The customers holding these accounts include individuals and non-financial firms. Banks and financial firms are also among the account holders but they do not generally hold demand deposits. This structure of bank funding assets has profitability as well as stability implications. Due to a large base of non-remunerative deposits the rate of returns on equity and quasi equity increases making Islamic banks attractive to direct investors (i.e., shareholders of the bank) as well as to indirect investors (investment account holders). However, due to callable nature of demand deposits and short-term nature of *muḍārabah* investment account banks' ability to invest in long-term projects is reduced or a maturity mismatch is encountered.

Table-4
Liabilities – Breakdown of Major Items

Major Items	Constituents
Customers' Funds	Current & Savings Accounts NOT Sharing in Profit *Muḍārabah* Investment Accounts *Muḍārabah* Savings Accounts Other (customer accounts, etc)
Funds Due To Other Creditors	Due to Banks and other Financial Institutions Due to Subsidiaries and Associated Companies Margins on LCs and Accounts Payable Due to Employees, Contractors and Suppliers
Profit and Other Liabilities	Profit/Dividend Payable Provision for Taxes and *Zakāh* Other Liabilities, NES
TOTAL LIABILITIES Total Shareholders' Equity	
TOTAL LIABILITIES AND EQUITY	

Figure-6
Composition of Liabilities

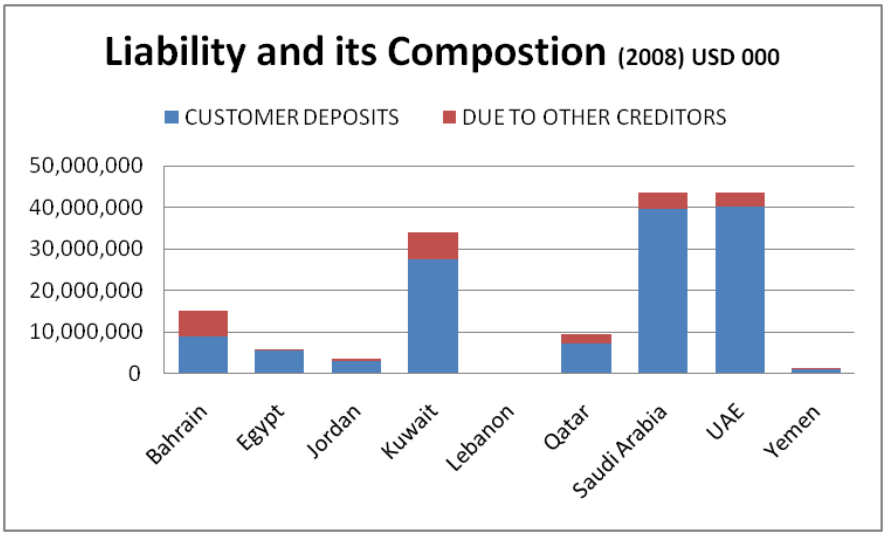
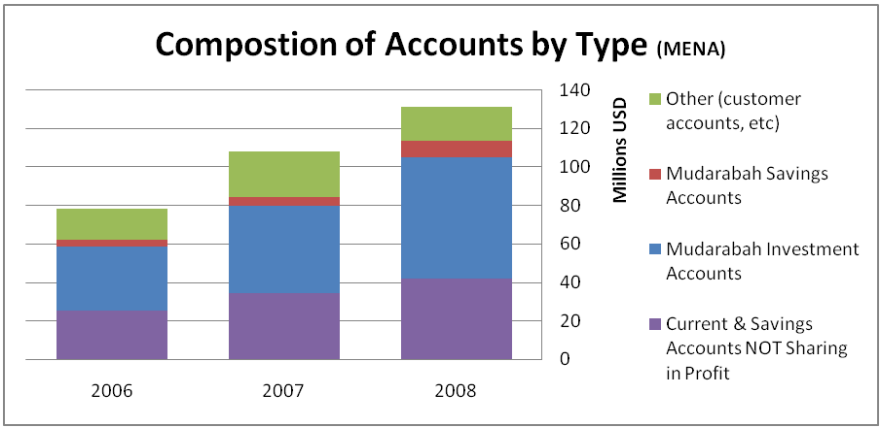


Figure-7
Composition of Accounts by Type



5. Drivers of Islamic Banking

The source of existence and growth of Islamic banking and finance is Islam itself and the extent and willingness of its followers to live according to their faith.[12] This does not imply that a number of other economic and social factors are of no importance, all the other factors have indeed contributed to its growth but they in themselves were not the reason for existence of Islamic finance. At present, Islamic finance is a demand driven industry whose customers are not only from among the Muslim population but in many countries a large number of non-Muslims are also among its customers by choice.[13] What factors drive the high growth of Islamic banking; and to what extent they can explain the differing levels of its growth among various countries of MENA region are important questions. Answering them can provide help in formulating policies for financial sector growth at national, regional as well as global level. However, a rigorous analysis of these issues will require extensive micro and macro data on social, behavioral, economic, and financial variables which are not currently available. Therefore the analysis in this section on the driving factors behind the growth of Islamic banking in the MENA region is only of preliminary nature.

To set up the framework for analysis we start with several observations. First, it has been observed in the world that the countries where Islamic finance is growing are those that are also witnessing overall development of their financial sectors in general or they already have a developed financial sector. Thus the factors that are important for overall growth of the financial sector may also contribute to the growth of Islamic banking and finance. However, this is not an unqualified statement as there are many distinctive features of Islamic banking that are not possible to come into play under the conventional banking setup, i.e., conventional banking regulations and its supportive institutional architecture, which are based on pure financial intermediation philosophy. Thus, we see that countries where regulatory support exists for Islamic banking (such as in the form of separate licensing and regulatory requirements, avoidance of double taxation, permission

[12] Islam prohibits interest, encourages trade and shuns gambling. It also provides detailed principles of contracts that curtail financial speculation, protect the rights of all parties, and promote social justice.

[13] It has been documented that a large portion of Islamic banking and finance customers in Malaysia are from ethnic Chinese and Indian population who are not Muslims. Malaysia is multiracial country and both Islamic and conventional banking options are equally available to all. Composition of customer of Islamic financial institutions operating in the West which include non-Muslims as well as the large proportion of Western conventional financial institutions who bought *Ṣukūk* in the international markets indicates that the demand is not restricted from Muslim customers only.

for the Islamic banks to get involved in trading and direct investment etc.) and where a level playing field is provided, Islamic banking is developing faster. This is our second observation. Third, to make a change in the regulatory environment a strong political will of the government is an important factor. Hence, it is likely that the countries where the governments (or political system) are proactive to make a change towards Islamic finance the Islamic banking will grow faster than in the countries where the government is indifferent to the concept or where it is discouraging it.[14] Fourth, Islamic banking is growing because of its demand by the society. This demand also contributes to influencing the political will. The demand in economic sense is the ability and willingness of the individuals and the corporate firms for utilizing Islamic banking services. The demand for Islamic banking in a country cannot simply be measured by the proportion of Muslim population in total population of that country. Considering MENA region countries for example, each one of these countries have a very high proportion of Muslim population yet differing levels of willingness.

For our analysis of drivers of Islamic finance in the MENA region we combined the second and third factors into one and performed a regression analysis using three factors, namely, general financial sector development, regulatory support and political will, and demand for Islamic finance. We operationalize these with some proxy variables and estimated a parsimonious model given the limited amount of data at hand. This model is used only to find the relative importance of the above three factors for Islamic banking growth in the region, but not in individual countries, by pooling the time-series and the cross-section data.[15]

The dependent variable – growth of Islamic banking is measured here by two proxies (i) ratio of assets of average Islamic banks to GDP, and (ii) ratio of deposits of average Islamic banks to GDP. Each one of these variables is taken as the dependent variable, one at a time, in two separate regressions. Here the use of 'average assets' and 'average deposits' of Islamic banks per country for each year rather than the use of 'total assets' and 'total deposits' of Islamic banks is to control for differences in sample size (number of banks) across countries. This is divided by GDP to control for country level differences in the GDP.

[14] Recent literature recognizes importance of political will as the real driver of financial sector development to the extent that this is more important than the law because the laws and regulations get implemented through political and social will. See an important article in this direction by Malmendier, Ulrike (2009), 'Law and Finance "at the Origin"', *Journal of Economic Literature*, Volume 47, Number 4, December 2009 , pp. 1076-1108(33).

[15] We have data on 9 countries of MENA region for 3 years on each of them, this makes a total of 27 data points in the pool.

Among the independent variables, the ratio of broad money (M2) to GDP is used to proxy for general financial sector growth. Demand for Islamic finance is measured by GDP per capita multiplied by Islamic finance awareness which is measured by the ratio of number of news items pertaining to Islamic finance to total number of news items on finance in general.[16] The data on the number of news items were gathered using Google News search engine. This method excludes advertisements but relies on news count, not on analysis of the news content.[17] The regulator support is measured by a dummy variable which can take values +1, 0, and -1 to signify the jurisdictions where Islamic finance is actively supported, indifferently looked upon, and discouraged respectively.

[16] To be exact the Islamic finance awareness index was created by calculating following hit-ratio: the Google News was searched for the terms "Islamic finance", "Islamic banking", and "Islamic hedging." The sum total of hits from these three searches were divided by the sum total of hits from the terms "finance", "banking" and "hedging". Each of these searches was made restricting the domains by each individual country so as to produce country specific results.

[17] Other methods of measuring awareness can also be devised such as number of books, articles, and features published in a given year within a country; number of teaching and training programs running in a country, etc. However, each of these will have their own limitations. We chose our variables for which data are easy to get, consistent, and which show sufficient variability over our limited period of analysis.

Table-5
Summary of Variables

Variable	Operational Definition of Variable	Explanation
Dependent Variable		
Some proxy for growth of Islamic banking		
Either	AAIBtGDP = Assets of average Islamic Bank / GDP	Captures increase in financing and investment operations of Islamic banks.
Or	DAIBtGDP = Deposits of average Islamic Bank / GDP	Captures increase in ability of Islamic banks to mobilize funds.
Independent Variables (to find drivers of growth)		
A) Growth of financial sector in general		
	1. M2tGDP = Borad Money (M2) /GDP	Higher the number higher the level of development of financial sector
	2. CCtGDP = Currency in Circulation/GDP	This highlights the use of cash money in transactions. It is expected to be negatively related to financial sector growth.
B) Demand for Islamic Finance		
	3. DIF = (GDP per CAPITA) x (HITRATIO, which is the ratio of Islamic finance news to total finance news). Data on news items was collected using Google-news search.	To measure ability and willingness to use Islamic banking services. Expected to be positively related with demand for Islamic Finance.
C) Regulatory Support		
	4. RSPW-Dummy = Dummy variable taking values +1, 0, -1 respectively, if the regulatory and government policy stance is supportive, indifferent, and discouraging to Islamic finance.	To measure regulatory support and political will in a subjective way. Higher the number, higher is the perceived support. It can be converted into objective measure by counting the supportive measures. For example, existence of separate regulations for Islamic banking means concerned, thinking, and caring regulator and political will of government to support Islamic finance

The Regression results are reported in Table 6 Panels A and B. The Panel-A shows the relative importance of (the above mentioned) three factors in driving the average assets of Islamic banks in the MENA region controlled for differences in

the GDP across countries. The regression results inform us that regulatory support is the most important factor followed by general financial sector development for expansion of assets of Islamic banks. The constant term is also large signifying that there are some other important factors not captured by our analysis. Interestingly, contrary to expectation the coefficient of the proxy variable to represent demand for Islamic banking is very small and has a negative sign. All three factors and the constant term turn out to be statistically significant. The model as a whole is also statistically significant but suffers from serial correlation as evidenced by the Durbin-Watson statistic. The Panel-B shows the relative importance of the three driving factors behind average deposits of Islamic banks in the MENA region controlled for differences in the GDP across countries. In this case too, the regulatory support was found to be much important followed by the general financial sector development followed by demand variable which was least important and negative. This time the constant term was relatively larger than all coefficients, indicating that some important determining factors are left out. All individual coefficients as well as the overall model are found to be statistically significant.

Table-6
Regression Results – Drivers of Islamic Banking in the MENA Region

Panel-A: Drivers of Assets per Islamic Bank

AAIBtGDP = C + b1 (M2tGDP) + b2 (DIF) + b3 (RSPW-Dummy) + e

Dependent Variable: AAIBtGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047991	0.010933	4.389474	0.0002
M2tGDP	0.032346	0.012748	2.537250	0.0184
DIF	-1.10E-05	4.53E-06	-2.418448	0.0239
RSPW-Dummy	0.050239	0.011066	4.539982	0.0001
R-squared	0.618143	Akaike info criterion		-4.298981
Adjusted R-squared	0.568336	Durbin-Watson stat		0.809056
F-statistic	12.41067	Prob(F-statistic)		0.000049

Panel-B: Drivers of Deposits per Islamic Bank

DAIBtGDP = C + b1 (M2tGDP) + b2 (DIF) + b3 (RSPW-Dummy) + e

Dependent Variable: DAIBtGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.032520	0.008440	3.853034	0.0008
M2tGDP	0.024637	0.009841	2.503397	0.0198
DIF	-8.01E-06	3.50E-06	-2.287970	0.0317
RSPW-Dummy	0.028891	0.008543	3.381949	0.0026
R-squared	0.488184	Akaike info criterion		-4.816570
Adjusted R-squared	0.421425	Durbin-Watson stat		0.737197
F-statistic	7.312664	Prob(F-statistic)		0.001297

We further investigated the anomalous result of very low importance of demand for Islamic finance in explaining Islamic banking growth in the above two regressions. For this purpose we separated the two components of the proxy variable for demand i.e., per capita income and ratio of Islamic finance news items to total financial news items, and included them as independent variables in the regression equations as follows:

AIBtGDP = C + b1 (M2tGDP) + b2 (HITRATIO) + b3 (GDP per CAPITA) + b4 (RSPW-Dummy) + e,

and

DAIBtGDP = C + b1 (M2tGDP) + b2 (HITRATIO) + b3 (GDP per CAPITA) + b4 (RSPW-Dummy) + e.

We found a large coefficient for the HITRATIO which was statistically significant at 5 percent level of significance but very small coefficient for GDP per CAPITA which was statistically not significant at 5 percent level of significance. This was true in both regressions (see Table 7 Panel-C and Panel-D). Thus the GDP per capita is not a very good proxy of demand for Islamic finance and hence for Islamic banking growth.[18] This result may be due to skewed income distribution in the countries as well as due to uneven access of the population to Islamic finance.

Another anomaly is in the negative sign of HITRATIO coefficient while it was expected to be positive. The variable HITRATIO gives the proportion of news items mentioning Islamic economics or Islamic finance in total news items pertaining to general finance and economics. The ratio may have become biased during the financial crisis period (the years spanning our sample) because the number of news items on general finance (the denominator) may have been growing faster than number of Islamic finance and economics news (the numerator), thus producing a negative relationship with the growth of Islamic finance.

[18] Per capita GDP is also not a good predictor of conventional banking growth. As a test case we used GDP per capita along with other financial sector development variables to predict conventional deposit corporations' assets in the MENA region and found very small and statistically insignificant coefficient. Similar results are found when we tried to predict conventional deposit corporation liabilities using GDP per capital as an explanatory variable.

Table-7
Regression Results – Refined Model

Panel-C: Drivers of Assets per Islamic Bank

Dependent Variable: AAIBtGDP
Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.066990	0.016217	4.130950	0.0004
M2tGDP	0.028642	0.013193	2.170941	0.0410
HITRATIO	-0.417916	0.197800	-2.112828	0.0462
GDPperCAPITA	-5.32E-07	3.73E-07	-1.427471	0.1675
RSPW-Dummy	0.053008	0.012226	4.335740	0.0003
R-squared	0.631101	Akaike info criterion		-4.259429
Adjusted R-squared	0.564028	Durbin-Watson stat		0.897109
F-statistic	9.409231	Prob(F-statistic)		0.000137

Panel-D: Drivers of Deposits per Islamic Bank

Dependent Variable: DAIBtGDP
Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.051240	0.011690	4.383199	0.0002
M2tGDP	0.021872	0.009511	2.299703	0.0313
HITRATIO	-0.409751	0.142588	-2.873669	0.0088
GDPperCAPITA	-3.53E-07	2.69E-07	-1.313213	0.2026
RSPW-Dummy	0.033081	0.008813	3.753563	0.0011
R-squared	0.568854	Akaike info criterion		-4.914015
Adjusted R-squared	0.490464	Durbin-Watson stat		0.933123
F-statistic	7.256707	Prob(F-statistic)		0.000694

6. Performance

Islamic banking in the MENA region has been a fast growing sector. As evidenced by data in Table 3 the assets, deposits, and financing all grew fast in the region during 2006-2007. However, the growth rate tapered off in 2007-2008 period, which may be due to the knock on affect of the financial crisis. Even with this moderation affect the performance of Islamic banking sector had been much

better than conventional banks during that period. The adverse affect of the crisis spilled over to Islamic banks only in 2009.

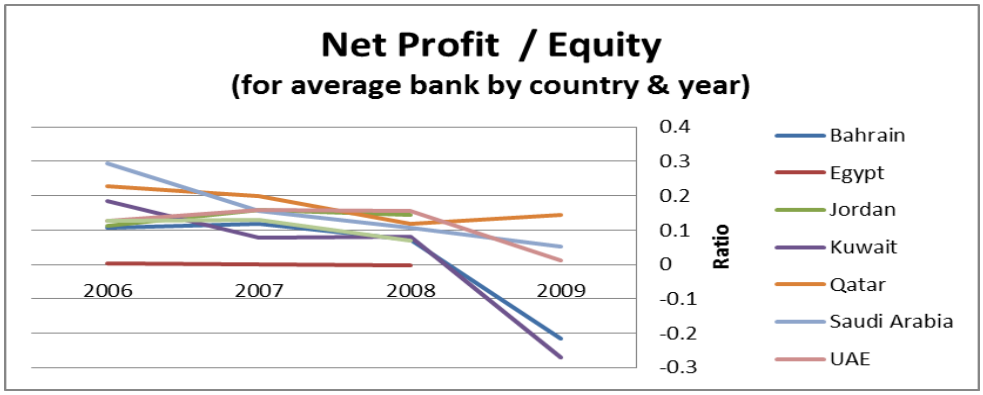
To systematically compare the performance of Islamic banks across countries a methodology is devised in this section whereby we compare the average of key ratios of Islamic banks in one country with the similarly averaged key ratios of Islamic banks in the other countries. This is, as if an average (representative) Islamic bank in one country is compared with the average (representative) Islamic banks in other countries as well as with the average for MENA region. The key ratios selected for analysis are: return to equity, return on assets, asset utilization ratio, and operating income to asset ratio.

The return to equity (ROE) as measured by net profit to total equity varied significantly across Islamic banks in our sample but in general remained high even during the global financial crisis when the conventional banking sector globally was severely affected. For example, for an average Islamic bank in UAE during 2008 the ROE was above 15 percent, highest in the region compared to other countries. During the same year ROE for an average Islamic bank in Bahrain was 7.2 percent, in Egypt about 0.1 percent, Jordan 14.4 percent, Kuwait 8.2 percent, Lebanon negative 9 percent, Qatar 11.9 percent, Saudi Arabia 10.7 percent, and Yemen 7 percent. The figures for Lebanon are an outlier in our sample as the only Islamic bank there came into being in 2006 and it is undergoing a developmental phase. However, the situation changed in the MENA region during 2009 when ROE of Islamic banks declined in most countries.

Figure 8 shows historical data on ROE, as measured by the ratio of net profit to total equity, for the years 2006 to 2008 for eight countries in the sample and up to 2009 for five of them where data was available. The ROE in the MENA region shows a converging pattern from 2006 to 2008 across countries. This may be due to the moderating affect of the financial crisis or it may reflect increasing integration and competition across the countries. However, between 2008 and 2009 a diverging trend is quite apparent with banks performing very differently across countries. Bahrain and Kuwait displayed highly negative ROE. While ROE figures also declined in other countries however they remained positive. On the contrary Islamic banks in Qatar witnessed an increase in ROE. Why the Islamic banking sector performed so differently across various countries during the stressful time in 2009 while they were converging in performance earlier? This is a highly important research question that can shed light on importance of various aspects for stability and growth of Islamic banking which requires a full-fledged research in future. Based on a-priori information, negative ROE in Bahrain can be attributed to

large number of small banks with relatively low capital base that reduce their capacity to diversify as well as lower their capacity to absorb credit losses from soured *murābaḥah* and *ijārah* transactions. In case of Kuwait the negative ROE, despite high capitalization of banks, may be attributable to lax regulation as well as to the limited domestic investment opportunities that led banks to invest in foreign markets and over exposure to real estate sector. The better performance of UAE in 2009 compared to Bahrain and Kuwait may be due to strong liquidity support provided by the Central Bank of UAE to its banking sector including the Islamic banks during the crisis.

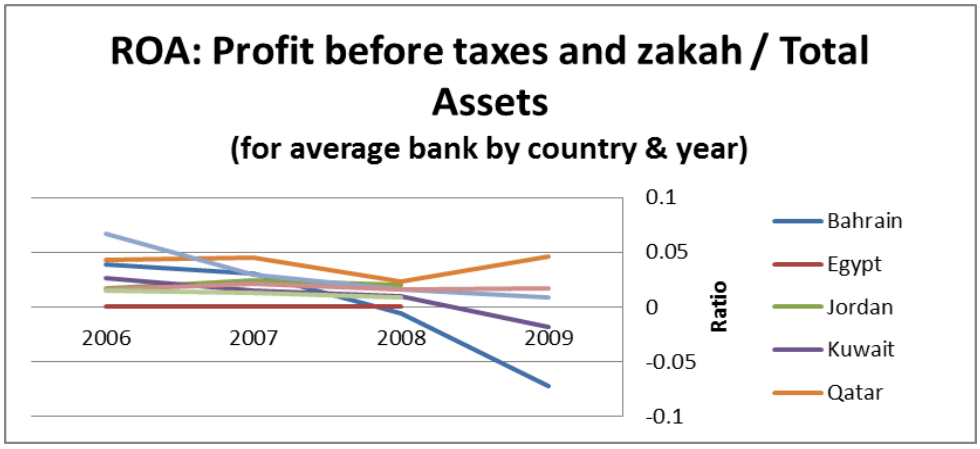
Figure-8
Average Return on Equity for Islamic Banks



The chart shows Return on Equity averaged for all Islamic banks by each country for each year since 2006. Data for Bahrain, Kuwait, Qatar, Saudi Arabia, and UAE goes up to 2009, while it goes only up to 2008 for Egypt, Jordan, and Yemen.

Return on assets (ROA) for average Islamic bank in every country of MENA region had declined in 2008 compared to 2007 but remained in the range of 2.3 percent to -0.06 percent. The trend in ROA had been downwards in most of the countries since 2006 with the exception of Jordan, Qatar and UAE where it had edged up during 2007 before coming down in 2008 (see Figure 9). However, in 2009 ROA declined sharply in most countries but in very divergent ways. The ROA declined to negative 7 percent in Bahrain and negative 2.1 percent in Kuwait. It declined but remained at positive 1.7 percent in UAE and at less than one percent in Saudi Arabia. But it increased to more than 4 percent in Qatar during the same year.

Figure-9
Average Return on Assets for Islamic Banks



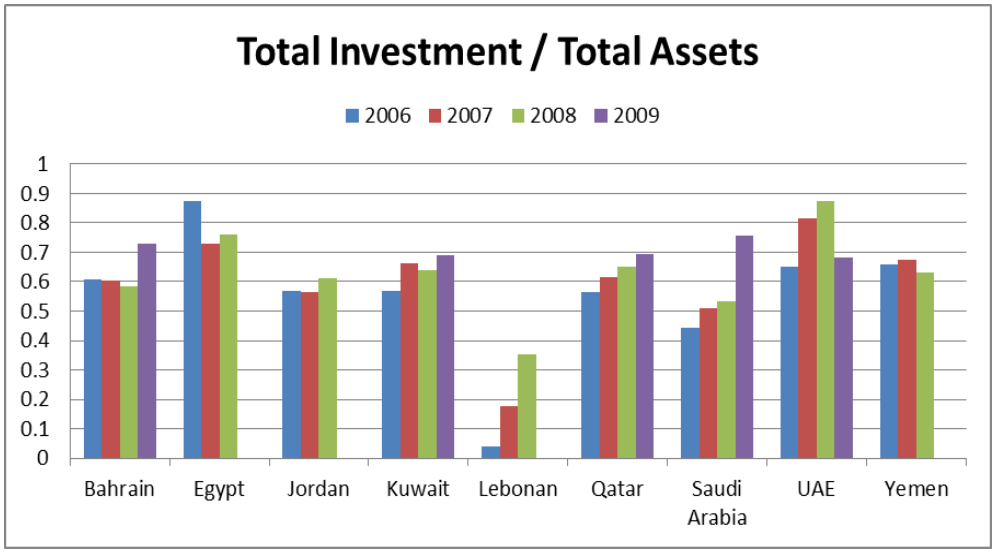
The chart shows Return on Assets (ROA) averaged for all Islamic banks by each country for each year since 2006. Data for Bahrain, Kuwait, Qatar, Saudi Arabia, and UAE goes up to 2009, while it goes only up to 2008 for Egypt, Jordan, and Yemen.

Asset utilization, as defined by the ratio of total investment to total asset, had been high and gradually increasing each year in most of our sampled countries during 2006 to 2008. Figure 10 compares asset utilization for average Islamic banks in different countries and across three years 2006, 2007 and 2008 for the full sample, and also for 2009 for five countries where data is available. The average asset utilization ratio for MENA region had been 62 percent in 2008 with highest being in UAE (87.6 percent) and lowest in Saudi Arabia (53.5 percent) excluding Lebanon. The higher asset utilization ratio is a direct result of the profit sharing nature of the deposit contract between Islamic banks and their depositors (*muḍārabah* based accounts). The *muḍārabah* based deposit accounts make it more imperative for the banks to keep the funds invested in real economic activity in order to generate returns for themselves and their depositors.

The asset utilization ratio still increased in 2009 in most countries however its pattern of growth changed. It increased sharply in Saudi Arabia (75.6 percent) and Bahrain (73 percent) but decreased significantly in the UAE (68 percent). Cautious stance of the Islamic banks in the face of real estate market collapse, their eagerness to increase the proportion of liquid assets and the diminished overall demand for credit all contributed to decline in asset utilization by Islamic banks in

the UAE. Whereas the spike in asset utilization along with an increase in the proportion of liquid assets of banks in Saudi Arabia and Bahrain points to a growing demand for finance and a growing banking sector in the two countries.

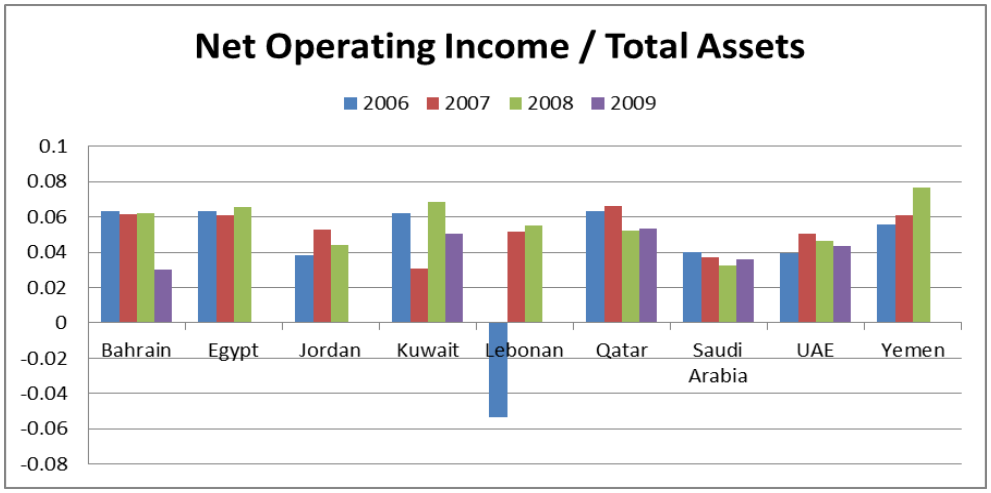
Figure-10
Asset Utilization Ratio



The chart shows Asset Utilization Ratio as defined by Investment/Total Assets averaged for all Islamic banks by each country for each year since 2006. Data for Bahrain, Kuwait, Qatar, Saudi Arabia, and UAE goes up to 2009, while it goes only up to 2008 for Egypt, Jordan, Lebanon, and Yemen.

The ratio of net operating income to total assets for average Islamic bank was quite variable across countries and across time. The data is shown in Figure 11 by country and year from 2006 to 2009. Average Islamic banks in Saudi Arabia stand out to have the lowest operating income to asset ratio throughout the period compared with average banks in other countries of the region. Another striking feature is a sharp decline in this ratio for average Islamic banks in Bahrain in 2009 compared to historical values from previous three years.

Figure-11
Net Operating Income/Total Assets



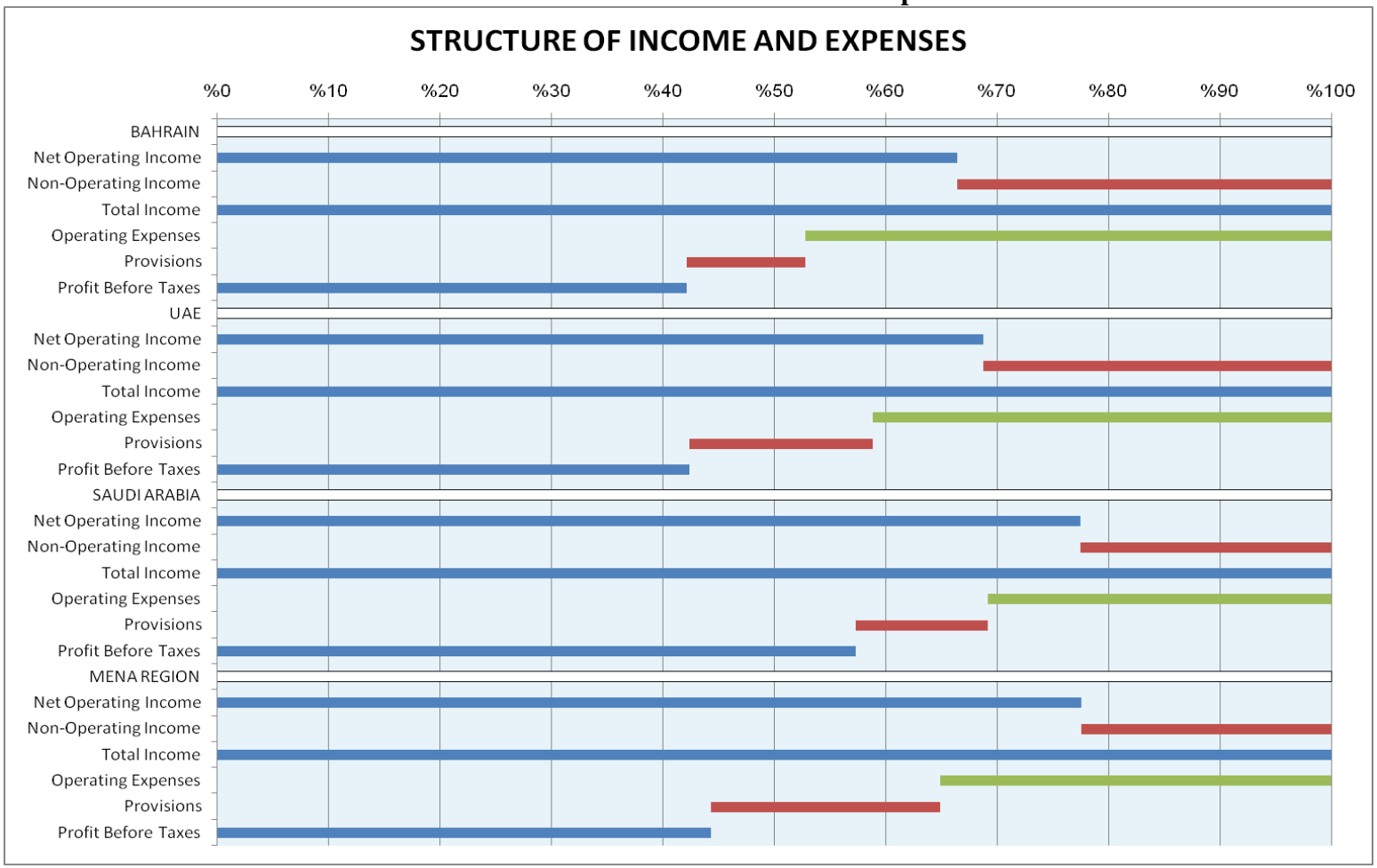
The chart shows ratio of Net Operating Income to Total Assets averaged for all Islamic banks by each country for each year since 2006. Data for Bahrain, Kuwait, Qatar, Saudi Arabia, and UAE goes up to 2009, while it goes only up to 2008 for Egypt, Jordan, Lebanon, and Yemen. Net Operating Income is defined as operating income after paying for the depositors' share.

6.1. Structure of Income and Expenses

Another dimension of performance evaluation is through examining the structure of income and expenses. Figure 12 shows for selected countries the breakdown of total income into operating and non-operating incomes and the breakdown of the total income into its uses: expenses, provisions, and profits before taxes.

The Proportion of net operating income in total income was highest for Saudi Arabia and lowest for Bahrain among the examined countries. The operational expenses as percentage of income were highest in Bahrain and lowest in Saudi Arabia. This may be due to economies of scale resulting from generally larger size Islamic banks in Saudi Arabia as opposed to smaller sized but numerous Islamic banks in Bahrain. As for the provisions, these were the largest percentage of income in UAE and smallest in Bahrain. These structures of income and expenses have implications for profits. The before tax profits as percent of income, on the average, were highest in Saudi Arabia and lowest in UAE.

Figure-12
Structure of Income and Expenses



7. Comparison with Conventional Banks

In the following graphs some comparison of Islamic banks with conventional banks in the region is made. This comparison is based on average Islamic bank vis-à-vis average conventional bank by each sampled country for each year, 2007 and 2008.[19]

The first graph (moving clockwise from upper left corner) in the panel Figure 13 shows the returns on assets (ROA) for average Islamic bank against that for average conventional bank in the selected MENA countries for the years 2007 and 2008. The data show that ROA across these two categories of banks are positively correlated. During 2007 the returns on assets (ROA) for average conventional banks were higher than average Islamic banks in four countries, were about equal in two countries, and lower in other two countries. Moreover, there was much diversity in returns on assets among countries in 2007. However, this variation narrowed in 2008 both across countries and between Islamic and conventional banks that they fall tightly around the 45 degree line.

Moving clock-wise, the second graph in the panel compares return on equity (ROE) for average Islamic bank vis-à-vis average conventional bank in each country for the years 2007 and 2008. During 2007 the ROE for averaged Islamic bank was higher than ROE for averaged conventional bank in two out of the nine sampled countries. This number increased to four out of nine countries in 2008. Moreover, the cross country variation in ROE of conventional banking increased in 2008 as compared to 2007 while it decreased for Islamic banking.

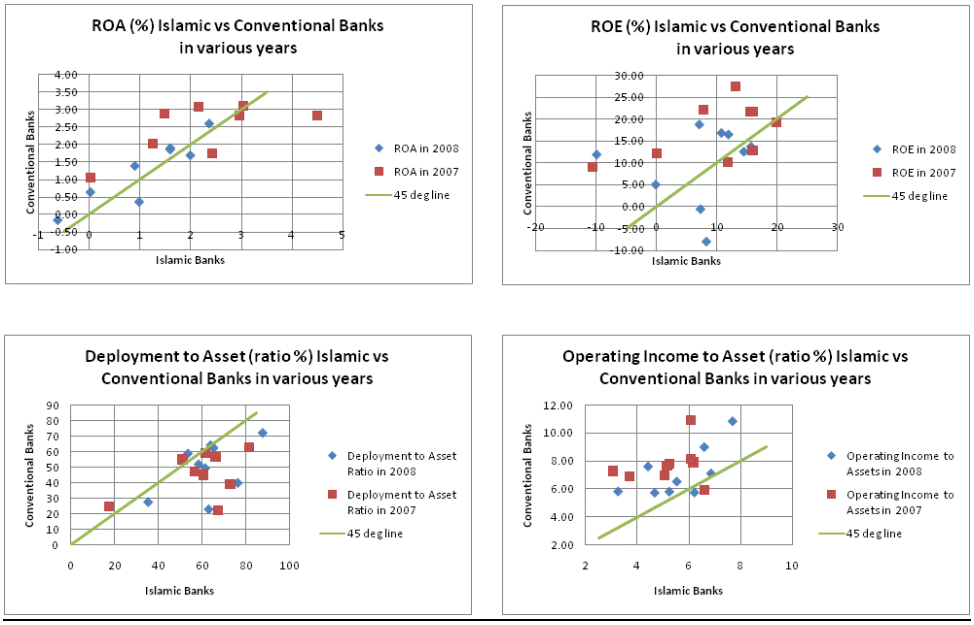
Moving clock-wise, the third graph in the panel compares the ratio of operating income to assets for average Islamic bank vis-à-vis average conventional bank in each country for the years 2007 and 2008. This ratio had been higher for conventional banking as compared to Islamic banking in 2007 and it remained higher in 2008. However, for this ratio, the difference between Islamic and conventional banking narrowed in 2008 as compared to the previous year.

The fourth graph in the panel compares deployment to asset ratio for average Islamic bank vis-à-vis average conventional bank in each country for the years 2007 and 2008. The deployment to asset ratio (which is same as asset utilization

[19] The data for conventional banks in this section are calculated based on the BankScope data for conventional banks for the countries in our sample.

ratio) was considerably higher in Islamic banking than the conventional banking in many countries during 2007 and it remained so in 2008.

Figure 13
Performance Indicators



8. Impact of Crisis

Why Islamic banks remained stable during the early part of the crisis?

To the extent Islamic banks try to emulate the conventional banks in the design of their financing products they expose themselves to similar credit, liquidity and solvency risks leading to similar systemic instability as experienced by conventional banking. The drive towards similarity with conventional banks is less by volition than a result of the current operating and regulatory environment which does not provide all the necessary support and infrastructure institutions that are needed for a well-functioning Islamic banking industry. Greater reliance by Islamic banks on credit type financing (*murābaḥah* and *ijārah*) at the expense of participatory financing is also a partial consequence of this. These factors translate into financial fragility similar to that of conventional banks.

Focusing on the actual practice rather than the theory and examining the factors that provided stability to the Islamic banks and financial markets during the crisis we find three factors stand out for their stability in the wake of crisis.

First, Islamic banks financing activities are more tied to real economic activities than their conventional counterparts. Though profit and loss sharing modes of *mushārakah* and *muḍārabah* provide better risk sharing along with maintaining a strong link with the real sector, they are used minimally for various reasons. Most of the financing activity is being done through *murābaḥah* and *ijārah* modes followed by that through *istiṣnāʿ* financing. For example, of the total financing activity of Islamic banks in the GCC region, during 2007 *murābaḥah* comprised of 65.4 percent, *ijārah* 12.78 percent and *istiṣnāʿ* 3.83 percent.[20] In our sample of 30 banks from 9 countries discussed above, *murābaḥah* constituted more than 90 percent of financing activity in Kuwait, UAE and Yemen; just less than 50 percent in Bahrain; and between 60 to 80 percent in rest of the countries during the year 2008.[21] On the average, for overall MENA region, the proportion of *murābaḥah* in total financing was 75 percent during the same year.

Murābaḥah and *ijārah* transactions require Islamic banks to know the client's purpose and use of finance. These modes also require ownership of the asset by the bank, albeit for shorter duration in case of *murābaḥah* and longer duration in case of *ijārah* finance. This increases the likelihood (or ensures) that the funds are used for their stated purposes. Thus, it keeps credit tied to real economic activity for each transaction and throughout the tenor of contract. In the conventional bank financing the client is not required to disclose the use of funds as long as the client is believed creditworthy or can post suitable collateral.

Whether this ownership by the bank of the financed asset helps the bank in credit risk mitigation is a different but related issue. To the extent banks own the assets in their names their first lien on collateral is established. The extent they can actually perform foreclosure in the event of default depends on the strength of protection of property rights in the law, efficiency of the legal system and social sensitivities involved impacting the credit risk of Islamic banks.

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[20] Data from Council of Islamic Banks and Financial Institutions (CIBAFI). 2007. *Islamic Finance in the GCC, CIBAFI Second Report*.

[21] *Murābaḥah* as percent of total assets was highest in Saudi Arabia and Bahrain (more than 78 percent) and lowest in Lebanon and Yemen (less than 30 percent) during 2008.

While *ijārah*, *murābaḥah* and *istiṣnāʿ* provide credit, they do so against usufruct, commodity and a future tangible asset. The credit thus created cannot be easily rolled over. Thus these modes keep a tab on ballooning of debt and credit, again maintaining a tie between the financial and the real sectors. Recently the increasing practice of *tawarruq* by some Islamic banks was loosening the tie of finance with real economic activity and contributing to easy rollover of debt. However, the very recent fatwa of OIC Fiqh Academy on the prohibition of organized *tawarruq* is expected to stop its growth.

Second, Islamic banks avoided direct exposure to exotic and toxic financial derivative products. Because of Sharīʿah prohibition against *ribā* and *gharar* the asset portfolio of Islamic banks did not include any CDOs, CMBSs, CDSs and the like which turned out to be highly toxic for conventional banks and amplifying factor for the crisis. These derivative products, initially created in the name of hedging needs became device for highly speculative investments among the conventional financial institutions. In such products fortunes are made or lost on occurrence of trigger events with no time for the institutions to strategize and amend their business strategies. Unavailability of hedging instruments for Islamic financial institutions was used to be cited as a hurdle in the growth of these institutions, but during the crisis this perceived weakness became a strengthening factor for Islamic financial institutions. However, exposure to other investment risks stemming from equity markets, *ṣukūk*, real-estate and ownership stakes in other businesses remain a source of concern when overdone or undertaken purely for speculative gains. Such investments at global level also bring in currency risk into the market risk. However, this is of lesser concern to banks in GCC where the currency is pegged to US dollar than to Islamic banks in the other countries of the MENA region and in other parts of the world.

Third, large amount of liquidity. Islamic banks in general have kept a larger proportion of their assets in liquid form than their conventional counterparts. The high liquidity existed for two reasons: (1) Given that there is no lender of last resort (LOLR) facility available to Islamic banks, and given that they do not have access to market liquidity in the form of interbank market therefore high liquidity was maintained purposefully by Islamic banks for risk management purpose. (2) Excess liquidity prevailed also due to lack of interest-free short-term investment opportunities as real economic investments require some gestation period. In some parts of the world such as the GCC region the liquidity position of Islamic banks had been quite high. For example, the ratio of liquid assets to total assets was 21.14

percent for Islamic banks in the GCC during 2007.[22] Moreover, the Islamic commercial banks in the GCC region enjoy a large liquidity buffer in the form of high reliance on retail depositor base, a large part of these deposits consist of non-remunerative current accounts. While Islamic investment banks are exposed to whole sale funding and private funds.

Why did Islamic banks and financial institutions start getting affected at a later stage of the crisis?

Figure 14 summarizes the different channels through which Islamic banks are getting affected by the crisis. As the global financial crisis became a global economic crisis it has started to affect Islamic banks and financial institutions in an indirect manner. The business model of many Islamic banks that relied on *murābaḥah* financing and predominantly invested only in the real estate sector and in the previously growing equity markets is now facing higher risks.

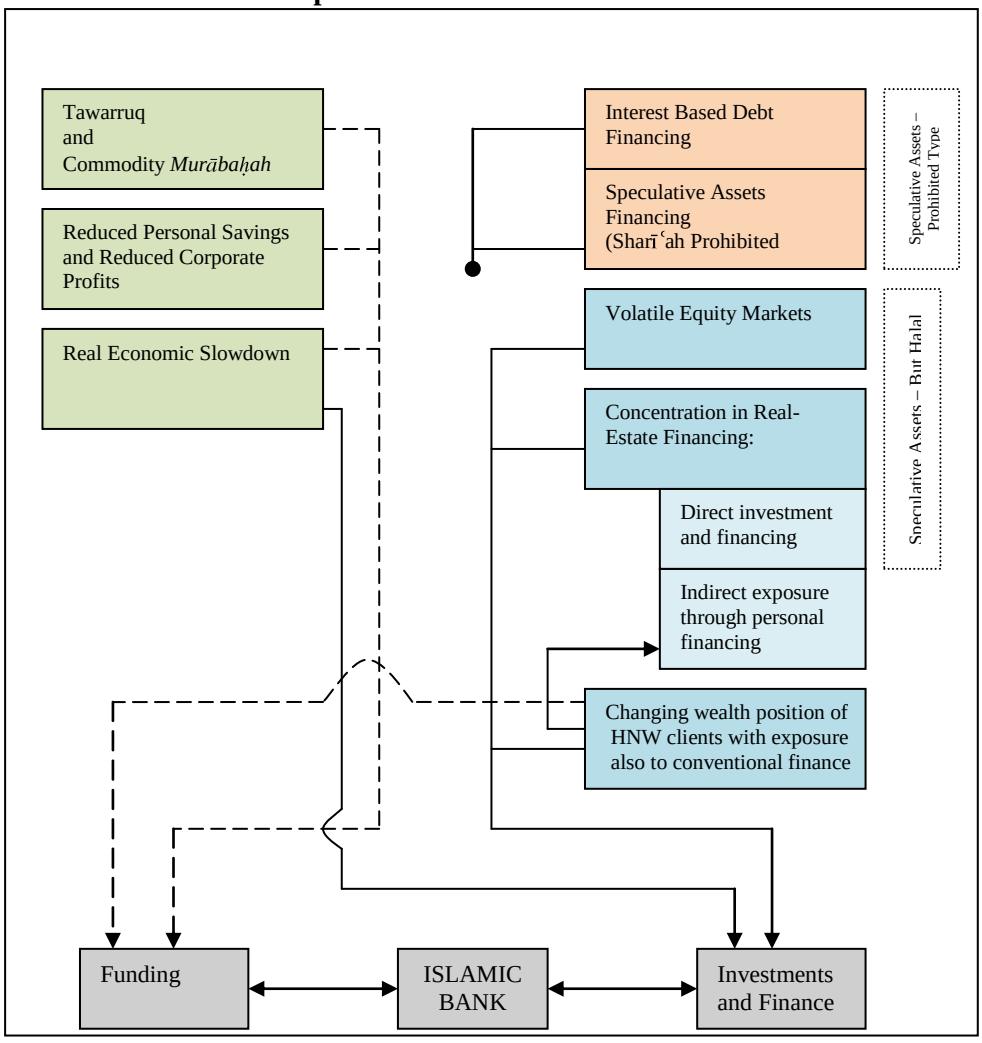
The financial crisis has triggered a chain reaction whereby the slowdown in the real economies of the developed countries has started to affect economic growth and investment activities in export driven economies of the developing countries through decreased trade in goods and services as well as through the declining commodity prices including that of oil. The economic downturn is not only affecting the investment and financing activities of financial institutions including those of Islamic banks, it is also decreasing the funding of these banks through reduced personal savings and declining corporate profits. It may be noted that most of the Islamic banking industry comprises of commercial banks whose major funding source are retail deposits, investment banking constitutes only a small portion of the industry.

Islamic banks in some regions may face risk on their financing and investment side of the balance sheet due to the crisis induced volatility of equity markets where these banks have large positions. Down-turn in the real estate markets where these banks have large direct and indirect exposures is also another source of risk. Similarly, the changing wealth position of their high net worth (HNW) clients who also hold financial exposure in the hard hit conventional financial sector of the West and therefore are now putting aside any investment plans is also a factor. The

[22] Data from CIBAFI. 2007. *Islamic Finance in the GCC, CIBAFI Second Report*. Liquid assets are defined here as cash and cash equivalent assets. Beck et al. (2010) also ascribe the better performance of Islamic banks during the recent crisis to their higher liquidity reserves and larger capital to asset ratio.

relative importance of each of these factors varies by the region. For example, the banks in the GCC region and particularly in UAE are more exposed to real estate market risk, followed by risk of international equity markets. For the banks in Asia their investments in domestic and international equity markets are a source of concern as equity markets are showing higher volatility. In some of the countries the existing fiscal imbalance which has widened after the crisis is also a factor in the increased volatility of the markets.

Figure-14
Channels of Impact of Fianncial Crisis on Islamic Banks



9. Conclusions

This paper analyzed the state of Islamic banking in the Middle East and North Africa (MENA) region. It explored the major Islamic banking models that are in practice along with the explanation and analysis of major balance sheet items on the asset and the liability sides of these banks. The paper also modeled and analyzed the key drivers of Islamic banking along with an assessment of their relative importance; evaluated the performance of Islamic banking and compared it with the conventional banking in the region; and lastly it evaluated the affect of financial crisis on Islamic banks along with an explanation of possible channels of its impact. Throughout the paper, the analysis is coined in terms of average Islamic bank within each country while utilizing a sample of 30 banks across 9 selected countries of the region.

The study finds that the Islamic banking sector has been growing in the region. This was true before, during and even after the crisis. The rate of deposit growth was slightly faster than the asset growth before the crisis which reversed in the post crisis period. Moreover, the size and growth of assets have varied considerably among the countries. Bahrain is more known center for Islamic banking in the region with largest number of Islamic banks, however, in terms of assets per bank, Kuwait and Saudi Arabia have on the average large size Islamic banks followed by UAE, Qatar and other countries. In terms of shareholders' equity also banks in Saudi Arabia and Kuwait have highest equity per bank followed by UAE, Qatar, Bahrain, and other countries.

On the asset side, financing constitutes major portion of assets followed by portfolio investment. This is true for the region as a whole as well as for average bank in most of the individual countries. However, during 2008 the growth in financing activity was very rapid in UAE along with a decline in the proportion of portfolio investment and a decline in the level of cash and cash equivalents. Within the financing category, *murābaḥah* has been the dominant mode of financing in many countries (ranging from a maximum of 90 percent to a minimum of 50 percent of financing) followed by *ijārah*. On the average 75 percent of financing activity in the MENA region during 2008 was based on *murābaḥah*.

On the liability side customer deposits (in the form of unrestricted and restricted investment accounts as well as current accounts) are the major source of funds followed by funds due to other creditors such as financial institutions. The composition of customer funds is however changing with time with rise in the

share of current and savings accounts that are not based on *muḍārabah* and hence do not share in profit. The changing structure of bank funding assets will have profitability as well as stability implications in future.

The paper also investigates the factors that drive the growth of Islamic banking and the extent they can explain the differing growth of Islamic banking among the countries of the region. We used proxy variables to reflect three factors: (i) general growth of conventional financial sector, (ii) regulatory support and political will of the government for Islamic banking, and (iii) demand for Islamic finance. We found that while the overall growth of conventional financial sector is an important determinant of growth of Islamic banking, implying there are some common factors that are important in the growth of both the conventional and Islamic finance. It is the strong regulatory support and political will that stands out even higher than demand for Islamic finance for the growth of Islamic banking in the MENA region. We have used very simple econometric models in this analysis while there is room for more refinement and extensive research in this area.

We also evaluated the performance of average Islamic banks across countries as well as in comparison with average conventional banks in those countries by using return to equity (ROE), return on assets (ROA), asset utilization ratio, and net operating income to assets ratio. In the past, the ROE and ROA in general had remained high and differed significantly across countries of the region. Between 2006 and 2008 there appeared to be a declining but converging trend in ROE, as well as in ROA, among these countries. However, after the crisis both ratios changed in considerably different ways among the countries. This may be a reflection of the differences in institutional and economic conditions among these countries resulting in different behaviors of Islamic banking under financial stress. In comparison with conventional banking the ROA in Islamic banking was similar to their conventional counterpart in the respective countries. However, the ROE was lower in case of Islamic banking compared to the conventional banking reflecting higher capitalization and lower leverage of Islamic banks.

Asset utilization in Islamic banking was generally higher than in conventional banking. The *muḍārabah* based deposit accounts make it more important for the Islamic banks to keep funds invested to generate returns for themselves and for their depositors in order to stay competitive. However, the ratios of operating income to asset for average Islamic banks were lower across the countries in comparison with conventional banks and these significantly varied across countries and across time. There is also evidence of economies of scale in countries with

larger size Islamic banks resulting in lower average cost and hence higher proportion of net operating income to total income.

The Islamic banking sector has demonstrated more resilience against the financial crisis mainly due to avoidance of interest. The requirement to abstain from interest made their financing activities more tied to real economy and also required them to avoid exposure to toxic financial derivatives. The commercial risk associated with Islamic banking activities and the non-availability of lender of last resort facility to these banks also forced them to hold liquid assets in greater proportion than their conventional counterparts. All these factors helped them during the crisis. The impact of the crisis came to these banks late and indirectly through slowdown in the real economy. Some banks were affected due to their asset concentration in real estate sector. However, there was no case of failure of Islamic bank in the region.

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Measuring Operational Risk Exposures in Islamic Banking: A Proposed Measurement Approach

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Abstract

The aim of the paper is to propose a model, namely Delta-Gamma Sensitivity Analysis-Extreme Value Theory (DGSA-EVT). DGSA-EVT is a model to measure HF-LS and LF-HS type of operational risks. The first leg of the proposed model, namely DGSA, is a methodology that deals with propagation of errors in the value adding activities which works by using measures of fluctuations in the activities.

The sensitivities of the output, hence, are deployed to estimate the performance volatility. Furthermore, the second leg of the proposed model, Extreme Value Theory (EVT), is a technique to cater for an excess operational loss over a defined threshold
which is normally characterised by low frequency and high severity (LF-HS) type of loss.

1. Introduction

The complexity of operational risk measurement has been exacerbated by two major dimensions of operational risk data, namely high frequency-low severity (*HF-LS*) and low frequency-high severity (*LF-HS*)[1], and the integration of scaling external and internal data[2]. Consequently, each type requires a different approach

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[1] See Moosa, 2007

[2] See Chernobai, Anna S., Rachev, Svetlozar T., and Fabozzi, Frank J., 2007

to cater for operational risk. The current literature on operational risk almost exclusively focuses on two issues: firstly, the estimation of operational risk loss processes using extreme value theory or Cox processes[3], and secondly, the application of these estimates to the determination of economic capital[4]. In the estimation of economic capital for operational risk, the estimates appear to be quite large, in fact, at least as large as that necessary to cover market risk[5]. As evidenced by the references mentioned earlier that the modelling and estimation of operational risk is treated identically to market and credit risk, i.e., a loss process is modelled and estimated. However, this is where the similarity comes to an end. Unlike market and credit risk, which are external to the bank in their origin, operational risk is internal to the bank.

An intensive use of Value at Risk (VaR) has also taken place in the measurement of risk exposure in financial institutions. For a long time, economists have considered empirical behaviour models of banks where these institutions maximise some utility criteria under a solvency constraint of VaR type[6]. Similarly, other researchers have studied optimal portfolio selection under limited downside risk as an alternative to traditional mean-variance efficient frontiers[7]. Moreover, internal use of VaR by financial institutions has also been addressed in a delegated risk management framework in order to mitigate agency problems[8].

Despite a growing interest in VaR related to credit risk and market risk; there is, unfortunately, a very limited research in the area of operational risk. Nevertheless, there has not been any research dealing with the theoretical properties of risk measures and their consequences on operational risk measurement in Islamic banking. Islamic Financial Services Board (IFSB) as one of regulatory bodies in Islamic banking industry in its draft No. 2 on Capital Adequacy Standard[9] mentions the definition of operational risk and proposes Basic Indicator Approach

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[3] See Chavez-Demoulin et al., 2006; Coleman, 2003; de Fontnouvelle et al., 2004; de Fontnouvelle et al., 2005; Ebnother et al., 2001; Jang, 2004; Moscadelli, 2004; Lindskog and MecNeil, 2003 ; K. Dutta, J. Perry, 2007.

[4] See de Fontnouvelle et al., 2004; de Fontnouvelle et al., 2005, Moscadelli, 2004, and Basel Committe on Banking Supervision, 2009.

[5] See Chernobai, Anna S., Rachev, Svetlozar T., and Fabozzi, Frank J., 2007

[6] This issue is discussed in Gollier et al., 1996; Santomero and Babbel, 1996.

[7] As exemplified in Roy, 1952; Levy and Sarnat, 1972; Arzac and Bawa, 1977.

[8] See Kimball, 1997; Froot and Stein, 1998; Stoughton and Zechner, 1999

[9] Islamic Financial Services Board, *Capital Adequacy Standards for Institutions (Other than Insurance Institutions) Offering Only Islamic Financial Services*, 2005, p. 17, www.ifsb.org. The two methods mentioned in IFSB Standards are adopted from Basel Committee on Banking Supervision Standard on International Convergence of Capital Measurement and Capital Standards: A Revised Framework, 2006.

(*BIA*) and the Standardised Approach (*TSA*) as methods to calculate operational risk capital. The proposed methods are basically meant for the calculation of capital which needs to be kept aside in order to cater for operational risks. There is, however, an essential step which is overlooked, namely a method to measure the magnitude of operational risk exposures.[10] The paper, hence, provides a proposed measurement approach to fill this gap[11].

The proposed model, namely *Delta-Gamma Sensitivity Analysis-Extreme Value Theory* (*DGSA-EVT*), is a model to measure *HF-LS* and *LF-HS* type of operational risks. The first leg of the proposed model, namely *DGSA*, is a methodology that deals with propagation of errors in the value adding activities which works by using measures of fluctuations in the activities. The sensitivities of the output, hence, are deployed to estimate the performance volatility. Through operating loss distribution that is the result of the entire quantification process, *DGSA* would help in generating the level of operational value at risk (*OpVaR*) of the analysed Islamic banks. Furthermore, the second leg of the proposed model, *Extreme Value Theory* (EVT), is a technique to cater for an excess operational loss over a defined threshold which is normally characterised by low frequency and high severity (*LF-HS*) type of loss.

The second section of the paper reviews in some more detail the existing models in operational risk measurement and its classifications. The third section explains the theoretical background of the proposed model and its features. In the fourth section, attention is focused on the empirical aspect of the proposed model. The paper concludes with a fifth section, which includes practical suggestions and some direction for future research.

2. Review of Operational Risk Modelling

Modelling operational risk ranges from mathematical to statistics-econometrical approach which is designed to measure the regulatory and economic operational risk capital. Different models are also designed to study causes and consequences

[10] This shortcoming is also reflected in the studies by Khan and Ahmed, 2001; Hassan and Dicle, 2005; Ismail and Sulaiman ,2005; Kahf,2005; Muljawan, 2005; and Sundararajan, 2005.

[11] It is expected that the proposed approach will result in an operational risk capital charge that credibly reflects the operational risk profile of the bank. This is the essence of Operational Risk Management System (ORMS) which consists of the systems and data used to measure operational risk in order to estimate the operational risk capital charge. ORMS is a subset of Operational Risk Management Framework (ORMF). For further discussion, see Basel Committee on Banking Supervision Consultative Document on Operational Risk-Supervisory Guidelines for the Advanced Measurement Approach, 2010.

of operational risk. Surely, a constantly changing financial environment has made modelling of operational risk vital[12]. Furthermore, operational risk modelling is also needed to provide bank management with a tool to make a better decision in carrying out a desirable level of operational risk management. It is also suggested that the only feasible way to effectively manage operational risk is by identifying and minimising it, which requires the development of adequate quantification techniques[13]. As a matter of fact, quantification of operational risk is a prerequisite for the formulation of an effective operational risk management and a sound economic capital framework[14].

2.1. Taxonomy of Operational Risk Modelling

The paper broadly classifies modelling in operational risk into three classes; (i) process approach, (ii) factor approach, and (iii) actuarial approach. It should also be noted that a selection of which approach to implement may largely depend on operational risk categories (ORC) which may vary across an institution. As clearly mentioned in the Basel Committee Document on the Supervisory Guidelines for the Advanced Measurement Approaches, a bank's risk measurement is greatly influenced by the number of ORCs used within the model[15].

Table-1
Approaches in Operational Risk Modelling

Process Approach	Factor Approach	Actuarial Approach
• Causal models • *Bayesian belief networks* • *Fuzzy logic* • Reliability analysis • Connectivity • *System Dynamics*	• Risk Indicators • Capital Assets Pricing equivalent models • Predictive models	• Empirical loss distributions • Explicit distributions parameterised using historical data • Extreme value theory

Source: Smithson and Song (2004)

[12] A. Peccia, "Using Operational Risk Models to Manage Operational Risk", in *Operational Risk: Regulation, Analysis and Management*, ed. C. Alexander, 2003, p. 363. London: Prentice Hall-Financial Times.

[13] K. Bocker and C. Klupperberg, "Operational VAR: A Closed Form Approximation", *Risk*, 2005, p.90.

[14] K. Fujii, "Building Scenarios", in *Operational Risk: Practical Approaches to Implementation*, ed. E. Davis, 2005, p. 171, London: Risk Books.

[15] See Basel Committee on Banking Supervision Consultative Document on Operational Risk-Supervisory Guidelines for the Advanced Measurement Approach, 2010, paragraph 33. A proposed operational risk categories (ORCs) for an Islamic bank is presented in the Appendix

2.2. Process approach

It is an approach that focuses on the chain of activities that comprise an operation or transaction (in much the same way that an industrial engineer examines a manufacturing process by looking at the individual work stations). Examples of this approach include:

- *Causal models;* it attempts to look at a specific outcome (for example, a settlement payment) in terms of the probabilistic impact of the activities that are in the chain (for example, recognition that a payment date has occurred, calculation of the settlement amount, notification of the counterparty, and paying or receiving). The success of each activity in the chain might be modelled as a function of inputs.

- *Reliability analysis*; it is used in operational research to measure the impact of failure of components in complex mechanical/electronic system. However, it is also widely implemented in operational risk to estimate the hazard rate of arrival of failure (operational risk event)

- *Connectivity*; which requires the modelling process to develop a 'connectivity matrix' that can then be used to estimate the likelihood of failure (or potential losses) for the process as a whole.

Three additional techniques that could be considered 'process' approaches are:

- *Bayesian belief network*, which extends the 'causal model' technique by treating theinitial model as the null hypothesis, and so, as data is collected, the model can be tested to provide a more accurate picture of the process.

- *Fuzzy logic* is a branch of mathematics that facilitates decision-making when some ofthe inputs are vague, or if they are subjective judgements. In a 'causal model', fuzzy logic could provide a way to aggregate the subjective drivers of a process.

- *System dynamics*, which extends the 'connectivity' approach; it is carried out by making the connections between dynamic activities. This technique requires a development of the model to simulate the cause-effect interactions among activities that make up the processes within the firm.

2.3. Factor Approach

A factor approach was initiated as an attempt to identify the significant determinants of operational risk – either at the institutional level or at the level of an individual business or individual process. The objective is to obtain an equation that relates the level of operational risk for institution *i* (or business *i* or process *i*) to a set of factors:

$$(OperationalRisk)_i = \alpha + \beta(Factor1) + \gamma(Factor2)$$

The key element of factor approach is the identification of appropriate factors in order to obtain the measures of the parameters α, β ,and γ. As a result, an estimation of the level of operational risk that will exist in future periods can be materialised. In the analysis of operational risk quantification, Smith and Song (2004) describe three applications of the factor approach:

- *Risk indicators*, in which regression techniques are utilised to identify the significant operational risk factors.

- *Capital Assets Pricing equivalent model*; a model that relates the volatility in share returns (and earnings and other components of the institution's valuation) to operational risk factors.

- *Predictive models*, which use discriminated analysis and similar techniques to identify factors that 'lead' to operational losses.

2.4. Actuarial Approach

An actuarial approach attempts to identify the loss distribution associated with operational risk – either at the level of an institution or at the level of a business or process.

- *Empirical loss distribution*, is the most straightforward way to estimate the loss distribution, using the institution's own data on losses or both internal data and (properly scaled) external data. However, empirical loss distributions will probably suffer from limited data points (especially in the tail of the distribution).

- *Explicit distributions parameterized using historical data* is one way to get around the sparse data problem. The analyst specifies a distributional form for the

loss distribution or a distribution for the frequency of occurrence of losses and a different distribution for the severity of the losses.

- *Extreme value theory* provides another way of getting around the data sparseness problem. This theory is an area of statistics concerned with modelling the limiting behaviour of sample extremes, which indicates that, for a large class of distributions, losses in excess of a high enough threshold all follow the same distribution (a generalised Pareto distribution).

3. Empirical Research in Islamic Banking

In the IFSB Draft No. 2 on Capital Adequacy Standard, operational risk is defined as the risk of losses resulting from inadequate or failed internal risk and Sharīʿah compliance risk (IFSB, 2005: 22)[16]. This definition is rather different from Basel 2 on operational risk[17]. However, IFSB adopts Basel 2's methodology in the calculation of a minimum capital requirement for operational risk exposure. Four methods have been proposed by the Basel; namely the Basic Indicator approach (*BIA*), the Standardised approach (*TSA*), the Alternative Standardised approach (ASA) and the Advanced Measurement approach (*AMA*). *BIA* takes the moving average of gross income as a proxy of the size of operational risk exposure and suggests a parameter of 15% to calculate the minimum capital required to stand for this kind of risk. *TSA* is a little more refined as it takes average gross income at the activity level after dividing a bank's activities into 8 categories and suggests a parameter for each of them ranging between 12 and 18 percent. Under the *ASA*, for retail and commercial banking business lines, loans and advances replace gross income as the proxy indicator. Finally, *AMA* allows using internal measurement methodologies to calculate the minimum capital requirement for operational risk exposure provided the bank satisfies certain qualification criteria to assure the supervisory authority of the existence of efficient and independent operational risk management system and of its ability to fairly estimate operational risk and the capital needed to face it, including the expected losses as well as the unexpected losses.

The IFSB standards provide fairly detailed guidance on adaptation of Basel 2 to the specific risk characteristics of Islamic banks. In particular, the IFSB draft proposes an adaptation of standardised approach to operational risk

[16] Islamic Financial Services Board, op cit. p. 22.

[17] In Basel 2, operational risk as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic and reputational risk. See Basel 2, 2005, paragraph 33.

measurement—based on externally provided rating categories—and within this framework allows supervisory discretion to recognise the extent of risks assumed by the PSIA's[18] in computing capital adequacy for Islamic banks. Kahf opposes the use of gross income as a proxy of operational risk exposure as set out by IFSB[19]. In this respect, his argument is in line with Sundararajan who argued that the use of gross income as the basic indicator for operational risk measurement could be misleading in Islamic Banks, as large volume of transactions in commodities, and the use of structure finance raise operational exposures that will not be captured by gross income.[20] However, Sundararajan (2005) still supports the standardised approach that allows for different business lines to be better suited, but would still need adaptation to the needs of Islamic banks.

Some empirical aspects of the operational soundness in Islamic banks were studied by Ismail and Suleiman (2005), Hassan and Dicle (2005) and Muljawan (2005). Using the Cavello and Majnoni model, Ismail and Suleiman discuss the interaction between the capital requirement as stated in the New Basel Capital Accord and the cyclical pattern of profit[21]. In addition to that, CAMEL[22] framework is deployed by Muljawan as an alternative tool to assess the operational soundness of Islamic banks.[23] The analysis of Hassan and Dicle is somewhat broader than other papers in the sense that it also discusses the nature of

[18] *PSIA* refers to profit sharing investment account

[19] Monzer Kahf, *Basel II: Implications for Islamic Banking*. Paper presented at the Sixth International Conference on Islamic Economics and Finance: Islamic Economics and Banking in the 21st Century, organized by Bank Indonesia, Islamic Research and Training Institute, The International Association for Islamic Economics, and University of Indonesia, 2005, p. 313

[20] V. Sundararajan, *Risk Measurement and Disclosure in Islamic Finance and the Implications of Profit Sharing Investment Accounts*. Paper presented at the Sixth International Conference on Islamic Economics and Finance: Islamic Economics and Banking in the 21st Century, organized by Bank Indonesia, Islamic Research and Training Institute, The International Association for Islamic Economics, and University of Indonesia, 2005, p. 127.

[21] Abd. Ghaffar Ismail and Ahmad Azam b. Sulaiman, Cyclical Patterns in Profits, Provisioning and Lending of Islamic Banks and Procyclicality of the New Basel Capital Requirement. Paper presented at the Sixth International Conference on Islamic Economics and Finance: Islamic Economics and Banking in the 21st Century, organized by Bank Indonesia, Islamic Research and Training Institute, The International Association for Islamic Economics, and University of Indonesia, 2005, p. 280.

[22] C(apital), A(sset quality), M(anagement), E(arning), and L(iquidity)

[23] Dadang Muljawan,, *A Design for Islamic Banking Rating System: An Integrated Approach.* Paper presented at the Sixth International Conference on Islamic Economics and Finance: Islamic Economics and Banking in the 21st Century, organized by Bank Indonesia, Islamic Research and Training Institute, The International Association for Islamic Economics, and University of Indonesia, 2005, p.317

operational risk.[24] However, it does not make any suggestions on how to handle capital requirements with respect to Islamic banks.

There are two things that can be highlighted from the review above; first, it is clear that the empirical research that have been conducted are on the aspect of capital attribution for operational risk; second, there is no unanimous standard of operational risk measurement method. The most recent research on this issue was conducted by Jackson-Moore; nevertheless, the writer could not come up with a conclusive suggestion on the refined measurement method.[25]

The following section attempts to discuss the proposed framework in measuring operational risk exposures in Islamic banks.

4. Delta-Gamma Sensitivity Analysis (DGSA): A Proposed Approach

The objective of operational risk management is to decide which risks are important to the bank so that it could determine their magnitude and mitigate them accordingly. Therefore a refined measurement method is required to provide a measure that has a defined relationship to a risk factor that can be assigned as controllable or uncontrollable. This would result in the determination of an appropriate intervention for controllable risks by focusing on their causes.

Given the foregoing discussion, the impact on operations can be separated into controllable risk and uncontrollable risk. In this study, a controllable risk is defined as any risk which has assignable causes that can be influenced. Generally, process-related risks will have assignable causes and therefore, they are controllable. For instance, classifying loan customers into the wrong credit categories can result in substantial differences in the default rates and loan provision requirements and is an example of a risk that is controllable because the cause is known.

Uncontrollable risk, on the other hand, is defined as any risk that does not have causal factors that can be influenced. Their impact is determined through loss

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[24] M. Kabir Hassan and Mehmet F. Dicle, *Basel II and Capital Requirements for Islamic Banks.* Paper presented at the 6th International Conference at Islamic Economics, Banking and Finance, organised by Islamic Research and Training Institute-Islamic Development Bank, Bank Indonesia, and Ministry of Finance Republic of Indonesia, 2005, p. 255

[25] Elisabeth Jackson-Moore, "Measuring Operational Risk", in *Islamic Finance: The Regulatory Challenge,* eds. Simon Archer and R.A.A.Karim, 2007, p. 239, Chichester: John Wiley & Sons (Asia) Pte Ltd.

models that analyse extreme values (losses), and use classification instead of causes. Ideally, extreme loss models will be used with scenarios that provide stress points for the analysis. Uncontrollable does not mean that there is nothing that can be done about it. There are many mitigation strategies that can be implemented in order to reduce the effects of a loss. Also, uncontrollable risks may become controllable if an assignable cause can be found and which would enable the management to carry out a corrective action.

The proposed *DGSA* deals with controllable risks; in other words, *DGSA* is designed to measure the magnitude of operational risk exposures which can be controlled, or *HF-LS* type of operational risks.

4.1. Building Blocks of DGSA

The analysis of *DGSA* begins by developing a function for a value adding process and then examining the key factors that contribute to the performance and their associated errors (uncertainties). This can be done by partitioning the business unit into different income generating channels (IGCs). IGCs contain different earnings function as the unit of analysis for measuring operational risk, as shown in Figure 1.

Income generating channels can be defined as the production unit by which a bank creates a product valuable to its customers. An activity in the income generating channels employs purchased inputs, human resources, capital, and some form of technology to perform its function[26]. Since a business unit has profit and loss reporting (by definition), its income generating processes are the key components that make up the profit and loss for the business unit. In our model, Islamic banks business model can be partitioned into three income generating channels, namely; (a) investment channel, (b) financing channel, and (c) service channel.

a) Investment channel, which comprises any investment in the form of a partnership. There are two types of investing instruments: fund management (*muḍārabah*) and equity partnership (*mushārakah*). *Muḍārabah*, which can be short, medium, or long term, is a trust-based financing agreement whereby an investor entrusts capital to an agent to undertake a project. Profits are based on a pre-agreed ratio. *Mushārakah*, which can be either

[26] Jack L. King, *Operational Risk: Measurement and Modelling*, 2001, p. 74, Chichester: John Wiley & Sons, Ltd.

medium or long term, is a hybrid of *shirka* (partnership) and *muḍārabah*, combining the act of investment and management. In the absence of debt security, the Sharīʿah encourages this form of financing.

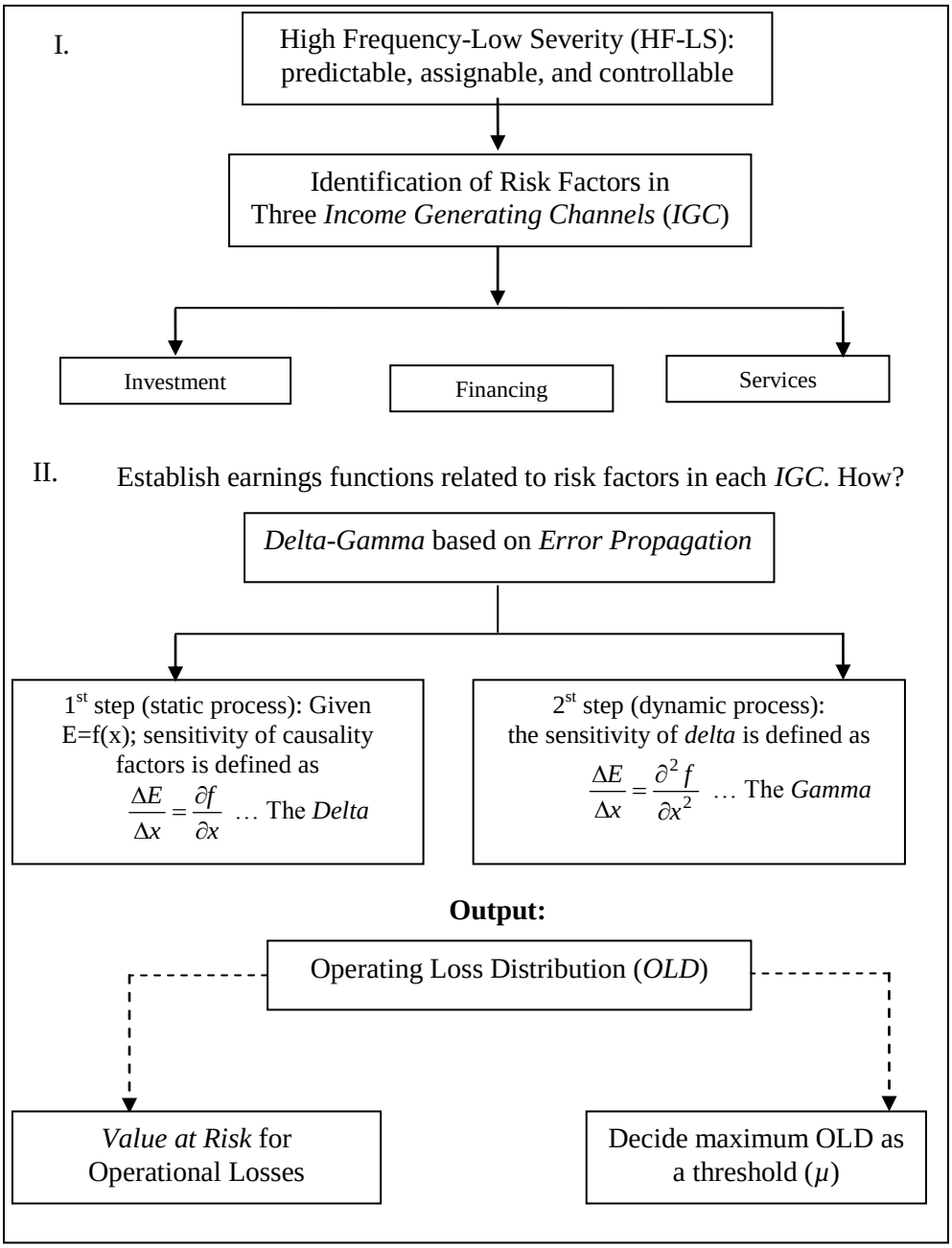
b) Financing channel, which contains any financing instruments that are used primarily to finance obligations arising from the trade and sale of commodities or property. Financing instruments also include instruments generating rental cash flows against exchange of rights to use the assets such as *ijārah* and *istiṣnāʿ*. Financing instruments are closely linked to a sale contract and therefore are collateralised by the product being financed. These instruments are the basis of short-term assets for the Islamic banks. *Murābaḥah*, a cost-plus sales contract, is one of the most popular contracts for purchasing commodities and other products on credit.

c) Service channel; consists of any financial transactions that create earnings by charging fees, an example of which is *juʿālah*.

For each income generating channel, an earning figure can be located and linked up with causal factors for the business. Causal factors can be defined as factors that have impacts on earnings. In other words, *DGSA* uses risk factors resulting from causal factors that create losses with a random uncertainty to measure the variability of earnings.

In contrast, un-assignable loss cannot be tied to a risk factor since the cause is normally unknown or is due to an external event. Based on the causality between risk factors contributing to assignable losses, an earning function can be produced in each income generating channel. The *DGSA* methods use factors which lead to loss and their sensitivities to generate loss distributions in different business units.

Figure-1
How Does the *DGSA* Work?



In it worth noting here that losses within business units are not normally accounted for in a systematic way that would allow their direct assignment to risk factors. Since there are a large number of small losses, many banks simply aggregate operational losses in general accounts along with other entries. They may be included as a cost of doing business or simply mixed up in the profit and loss accounting. Without having a loss figure that can be linked to risk factors, therefore, it is almost impossible to produce a direct measurement of operational risk caused by assignable loss. Hence the *DGSA* method can overcome this problem.

In summary, the steps of building *DGSA* frameworks are as follows:

1) Establish the business model with income generating channel
2) Determine the risk factors for the major activities in the income generating channel
3) Determine the relations between risk factors and earning through setting up earnings function in different income generating channel
4) Estimate operational losses using uncertainty of the risk factors propagated to the risk in earnings (*Delta-Gamma* method)
5) Set the threshold of operating losses from the processes using the risk factor uncertainties and operating losses from *Delta-Gamma* method
6) Filter the large losses using the threshold.

4.2. Key Features of DGSA

The *DGSA* methodology is the calculation technique to determine the value of the assignable losses based on the sensitivity causality between the risk factors. *DGSA* is produced through error propagation of the risk factors to measure operational risk. The uncertainty of the risk factors is utilised to calculate the uncertainty in earnings using sensitivities from which the relation of the change in earnings to a change in the risk factors can be located.

In *DGSA*, operational risk is measured as the uncertainty in earnings due to two parts. First, using the uncertainty in causal factors for losses up to a threshold and second, using a large loss model for un-assignable loss above a threshold. Causality model, hence, plays a critical role in determining the risk factors establishing the model. Hence, the combination of the two constitutes *DGSA* and is described by the operational risk formula as follows:

$$u(E) = fu(\Delta X_1)...u(\Delta X_n)) + \Phi(L_{unassignable} \left| L_{unassignable} > \mu \right.) \quad (1)$$

Uncertainty in earnings due to operational risk is a function of the uncertainties in a set of risk factors plus a function of the distribution of un-assignable losses larger than a given threshold (μ). *DGSA* method is used to calculate the first term in the model. This model expresses the uncertainty in earnings as a function of the uncertainty in a set of risk factors:

$$u(E) = f(u(\Delta X_1)...u(\Delta X_n)) \quad (2)$$

DGSA method for measuring operational risk is based on the five following key concepts:

1. Earnings as a function of causal factors.
   In *DGSA* method, it is assumed that earnings are described by a series of causal factors. For a given earnings level, there is a set of causal factors whose values are used to estimate earnings:

   earnings = f (causal factors) (3)

   Earnings are described as a function of a set of causal factors. For example, earnings may be calculated as 20% of sales revenue minus an adjustment for rejects. By separating the causal factors into constants and volatilities, earnings can be described by a set of performance drivers that create the expected level of earnings and a set of risk factors that create volatility in the level of earnings (risk):

   earnings = f (performance drivers) ± f (risk factors) (4)

   Earnings are described as a function of performance drivers for level and risk factors for volatility. Therefore, in the model, earnings are calculated as 20% of sales revenue minus the variance to target cost for rejects. ‘Sales revenue’ is the performance driver and ‘rejects’ is the risk.

2. The risk in earnings is a random fluctuation in value caused by uncertainty in the risk factors. Given

$$E = f(x) \quad (5)$$

Therefore

$$u(E) \approx f(u(x)) \quad (6)$$

3. The basic measure of uncertainty for operational risk is the standard deviation of the mean, or standard error.

In general, the standard deviation of the mean of the measured values is referred to as the standard error or simply the error[27]. It is calculated from a sample of *n* measures using the following formula:

$$\sigma_{\bar{x}} = \sqrt{\frac{1}{n(n-1)}\sum_{k=1}^{n}(x_k - \bar{x})^2} \qquad (7)$$

Whereby $\bar{x}$ is the mean of the analysed operational risk variable.

4. Uncertainties are combined using the formula for the expected value of the sum of variances.

This formula is given for the simple case of correlation values of only 0 or 1, corresponding to independent analysed operational risk variables and others that are perfectly correlated. Normally this should be sufficient for operational risk measures.

$$\sigma_z^2 = \sum_i \sigma_i^2 + \left(\sum_j \sigma_j\right)^2 \qquad (8)$$

Formula for combining uncertainties using standard errors where the *i'*s are uncorrelated and the *j'*s are correlated (perfectly) measures.

5. Uncertainties for functions of uncertainty measures are calculated using *the law of error propagation*. For each risk factor, the sensitivity of the earnings with respect to the factor is needed. The sensitivity is the amount of change in earnings given a single unit change in the factor with everything else remaining unchanged, or the partial derivative of the earnings function with respect to the factor. Given the earnings function that expresses earnings as a function of a factor

$$E = f(x)$$

[27] Aswath Damodaran, *Corporate Finance: Theory and Practice*, 2001, p. 153, New York: John Wiley & Sons, Inc.

Then sensitivity is defined as

$$\frac{\Delta E}{\Delta x} = \frac{\partial f}{\partial x} \tag{9}$$

The method of combining measurement uncertainties from various factors and accounting for their correlation is known as the *propagation of uncertainty*. The basic formula uses the sensitivities (partial derivatives) of the factors to calculate the standard deviation of the estimate. It is based on a Taylor approximation for the uncertainty in terms of factors such as:

$$R = f(X_{1,}X_2 ... X_n) \tag{10}$$

Using the Taylor approximation's first term, the uncertainty for the measure can be figured out using the following technique:

$$u^2(r) = \sum_{i=1}^{n} \left(\frac{\partial f}{\partial x_i} \right)^2 u^2(x_i) + 2 \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \frac{\partial f}{\partial w_i} \frac{\partial f}{\partial w_j} \sigma_i \sigma_j \rho_{ij} \tag{11}$$

The formula shown above is the formula for the calculation of combined uncertainty from many factors, also known as the 'general law of error propagation'. Where $u(\cdot)$ denotes the uncertainty in the value, r is the risk measurement, x is the factor, and f is the functional relationship between x and r. The partial derivative term is known as the sensitivity to the factor. This formula also explicitly considers correlation between factors ρ_{ij}.

6. The *gamma* (Γ) of a portfolio on an underlying assets is the rate of change of the portfolio's delta with respect to the price of the underlying asset. While the *delta* is the first derivative of the model, the *gamma* is the second partial derivative of the portfolio with respect to different risk factors:

$$Gamma = \frac{\partial^2 \pi}{\partial S^2} \tag{12}$$

If the value of *gamma* is small, the *delta* changes slowly and adjustments to keep a portfolio *delta* neutral only need to be made relatively infrequently. However, if *gamma* is large in absolute terms, then *delta* is highly sensitive to the price of the underlying asset. It is then quite risky to leave a *delta* neutral portfolio unchanged for any length of time. In this study, *gamma* is an important factor in determining which risk factors are more influential to income generating channels.

It is expected that partnership type of financing, such as *muḍārabah* and *mushārakah* would give higher value since they are likely to increase the level of operational risk exposures.

7. *Threshold*; it is used to separate losses to be analysed using *DGSA* from those that are not assignable. As highlighted in the earlier paragraph, *DGSA* deals with small losses (*HF-LS* type of operational risks); hence, the threshold is the transition point from small loss (*HF-LS*) to large loss (*LF-HS*). However, to ensure that there will not be any overlap, meticulous calculations must be carried out to set the threshold precisely since losses assigned to risk factors using *DGSA* method are assumed to have random error properties. And *DGSA* is used to estimate the central tendency of this uncertainty.

4.3. Why Sensitivity Analysis?

The activity in the field of sensitivity analysis (*SA*) has been steadily growing, due to the increasing complexity of numerical models, whereby *SA* has acquired a key role in testing the correctness and corroborating the robustness of models in several disciplines. This has led to the development and application of several new *SA* techniques[28]. Most of the recent literature in portfolio management has proposed *SA* approaches based on partial derivatives (*PDs*)[29].
Nevertheless, recent studies in the *SA* literature have highlighted that *PDs*-based *SA* suffers from several limitations when used for parameter impact evaluation and risk management purposes[30]. It is shown that a *PDs*-based *SA* to evaluate the impact of parameter changes with respect to the generic model output[31]:

1) is equivalent to neglecting the relative parameter changes, or, equivalently, to impose that all the parameters are varied in the same way;

2) does not allow the appreciation of the model sensitivity to changes in groups of parameters

[28] Studies by Borgonovo and Apostolakis, 2001a; Saltelli, 1997; Saltelli, 1999; Saltelli, Tarantolla and Chan, 1999; Turany and Rabitz, 2000 show the importance of sensitivity analysis approach in financial analysis.
[29] As brought forward by Drudi, Generale and Majnoni, 1997; Gourieroux, Laurent and Scaillet, 2000; Manganelli, 2004; McNeal and Frey, 2000.
[30] See Borgonovo and Apostolakis, 2001a; Borgonovo and Apostolakis, 2001b; Borgonovo and Peccati, 2004; Borgonovo and Peccati, 2005; Cheok, Parry and Sherry, 1998.
[31] As argued by Borgonovo and Apostolakis, 2001a; Borgonovo and Apostolakis, 2001b; Borgonovo and Peccati, 2004.

Therefore, using Elasticity (*E*) is considered to be a better alternative as compared to *PDs*[32]. In this case limitation 2 would still be in place, as *E* is not additive; and limitation 1 would be replaced by introducing *E* to impose on any parameters that are changing by the same proportion.[33]

This study will show that the use of Differential Importance Measure (*D*) would overcome the two above mentioned limitations.
Let us consider the generic model output:

$$Y = f(x) \tag{13}$$

Where $x = \{x_i, i = 1,2,\ldots,n\}$ is the set of the input parameters. Suppose:

$$dx = [dx_1, dx_2,\ldots,dx_n]^T$$

Which denote the vector of change; if *f(x)* is differentiable, then the differential importance of x_s *at* x^0 is defined as[34]

$$D_s(x^0, dx) = \frac{df_s(x^0)}{df(x^0)} = \frac{f'_{x_s}(x^0)dx_s}{\sum_{j=1}^{n} f_j(x^0)dx_j} \tag{14}$$

D can be interpreted as the ratio of the (infinitesimal) change in *Y* caused by a change in x_s and the total change in *Y* caused by a change in all the parameters. Thus, *D* is the normalised change in *Y* provoked by a change in parameter x_s. It can be shown that[35]:

a) *D* shares the additivity property with respect to the various inputs, for example, the impact of the change in some set of parameters coincides with the sum of the individual parameter impacts. More formally, let $S \subseteq \{1,2,\ldots, n\}$ identify some subset of interest of the input set; hence it would give:

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[32] CP. Simon, C.P. and L. Blume, *Mathematics for Economists*, 1994, p. 127. New York: W.W. Norton & Co

[33] See (Borgonovo and Apostolakis, 2001a; Borgonovo and Apostolakis, 2001b; Borgonovo and Peccati, 2004; Borgonovo and Peccati, 2005).

[34] E. Borgonovo and L. Peccati, "Sensitivity Analysis in Investment Project Evaluation", *International Journal of Production Economics*, 90 (2004), p. 20

[35] As concluded by Borgonovo and Apostolakis, 2001a; Borgonovo and Apostolakis, 2001b; Borgonovo and Peccati, 2004; Borgonovo and Peccati, 2005.

$$D_s(x^0, d_x) = \frac{\sum_{s \in S} f_s(x^0) dx_s}{\sum_{j=1}^{n} fj(x^0) dx_j} = \sum_{s \in S} D_s(x^0, dx) \tag{15}$$

As a consequence,

$$\sum_{s=1}^{n} D_s(x^0, dx) = 1 \tag{16}$$

for example, the sum of the D_i *(i=1,…,n)* of all parameters is equal to unity.

b) Equation (2) shows that *D* accounts for the relative parameters changes through the dependence on *dx*. In fact, equation (14) can be rewritten as:

$$D_s(x^0, dx) = \frac{f_s(x^0)}{\sum_{j=1}^{n} f_j(x^0) \frac{dx_j}{dx_s}} \tag{17}$$

In the hypothesis of uniform parameter changes (*H1*) ($dx_j = dx_s \ \forall j,s$), the following can be produced:

$$D1_s(x^0) = \frac{f_s(x^0)}{\sum_{j=1}^{n} fj(x^0)} \tag{18}$$

Hypothesis of proportional changes (*H2*) $\left(\frac{dx_j}{x_j^0} = \omega \forall j \right)$, would result in:

$$D2_s(x^0) = \frac{f_s(x^0) \cdot x_s^0}{\sum_{j=1}^{n} fj(x^0) \cdot x_j^0} \tag{19}$$

It can be shown that *D* generalises other local *SA* techniques as the *Fussel-Vesely importance* measure and *Local Importance Measure* based on normalised partial derivatives, also known as Criticality Importance or *E*. More specifically, in case *H2* it holds that[36]:

$$D2_s(x^0) = \frac{E_s(x^0)}{\sum_{j=1}^{n} E_j(x^0)} \tag{20}$$

where $Es(x^0)$ is the elasticity of Y with respect to x_s at x^0. Equation (20) shows that *E* produces the importance of parameters for proportional changes.

[36] E. Borgonovo and L. Peccatti, op cit., p. 23

5. Determination of Risk Factor Contribution

From the practitioners' viewpoint, a pertinent issue is how much each of the process contributes to the risk exposure[37]. If it turns out that only a fraction of all processes significantly contribute to the risk exposure, then the risk manager should only focus on this particular process. It is, therefore, important to analyse how much each single process contributes to the total risk. This study considers operational value at risk (*OpVaR*) resulting from operating loss distribution as a risk measure. To split up the risk into its process components, this study compares the incremental risk (*IR*) of the processes.

Let $IR_\alpha(i)$ be the risk contribution of process *i* to *OpVaR* at the confidence level α.

$$IR_\alpha(i) = OpVaR_\alpha(P) - OpVaR_\alpha(P\backslash\{i\}), \tag{21}$$

Where $P\backslash\{i\}$ is the whole set of workflows without process *i*. Since the sum over all IR_α's is generally equal to the *OpVaR*, the relative incremental risk ($RIC_\alpha(i)$) of process *i* is defined as the $IR_\alpha(i)$ normalised by the sum overall IR_α, i.e.

$$RIC_\alpha(i) = \frac{IR_\alpha(i)}{\sum_j IR_\alpha(j)} = \frac{OpVaR_\alpha(P) - OpVaR\alpha(P\backslash\{i\})}{\sum_j IR_\alpha(j)} \tag{22}$$

as a further step, for each α, this paper counts the number of processes that exceed a relative incremental risk of 1%. The resulting curve is attributed as parameter α or the Risk Selection Curve (*RiSC*)

6. Extreme Value Theory (EVT)

Extreme value theory (EVT) is a field of study in statistics that focuses on the properties and behaviour of extreme events. In general, there are two main kinds of model for extreme values. The most traditional models are the *block maxima* models; these are models for largest observations collected from large samples of identically distributed observations. The second type of model which is more comprehensive is the peak over threshold (POT) model; this is a model for all large observations that exceed some high level, and is generally considered to be the most useful for practical applications, due to their more efficient use of the data (often limited) on extreme outcomes.

[37] S. Ebnother et al., *Modelling Operational Risk*, 2001, p. 5, Working Paper, ETH Zurich

In our analysis, the application of EVT as the second leg of the proposed model starts after the determination of a transition point resulting from *DGSA*. It is important to note that the transition point is typically classified as the maximum threshold. EVT offers a parametric statistical approach for the extreme values of data. Its roots are in the physical sciences and it has recently been applied to insurance. Since traditional statistical techniques focus on measures of central tendency (e.g. mean), they are not as accurate when estimating values very far from the centre of the data. EVT, on the other hand, deals only with the extreme values and ignores the majority of the underlying data and its measures in order to provide better estimates of the 'tails'.

The EVT methodology for operational risk is basically a loss model for large losses using a *GPD* for the severity. The technique for fitting the GPD to data is the peaks over threshold method (*POT*), where large values over a specific threshold are fitted to the GPD. Following Chavez-Demoulin et al.[38], the POT method deployed in the analysis uses the following basic assumptions:

- The excesses of an independent identically distributed (or stationary) sequence over a high threshold *u* occur at the times of a Poisson process;
- The corresponding excesses over u are independent and have a GPD;
- Excesses and exceedance times are independent of each other.

6.1. Operating Framework for EVT

As depicted in Figure 2, the steps for operating EVT in our analysis start with the separation of loss amount into its severity and frequency.

Furthermore, excess losses are fit to a GPD to determine the severity of a loss given that it exceeds the threshold. This is a conditional severity distribution for large losses. Since the number of exceedances follows a Poisson distribution, it is fitted and used to estimate the frequency of exceedances. Combining the severity and frequency distributions in a Monte Carlo simulation gives the excess loss distribution. The resulting excess loss distribution is a multi-period loss distribution for only those losses that exceed the threshold.

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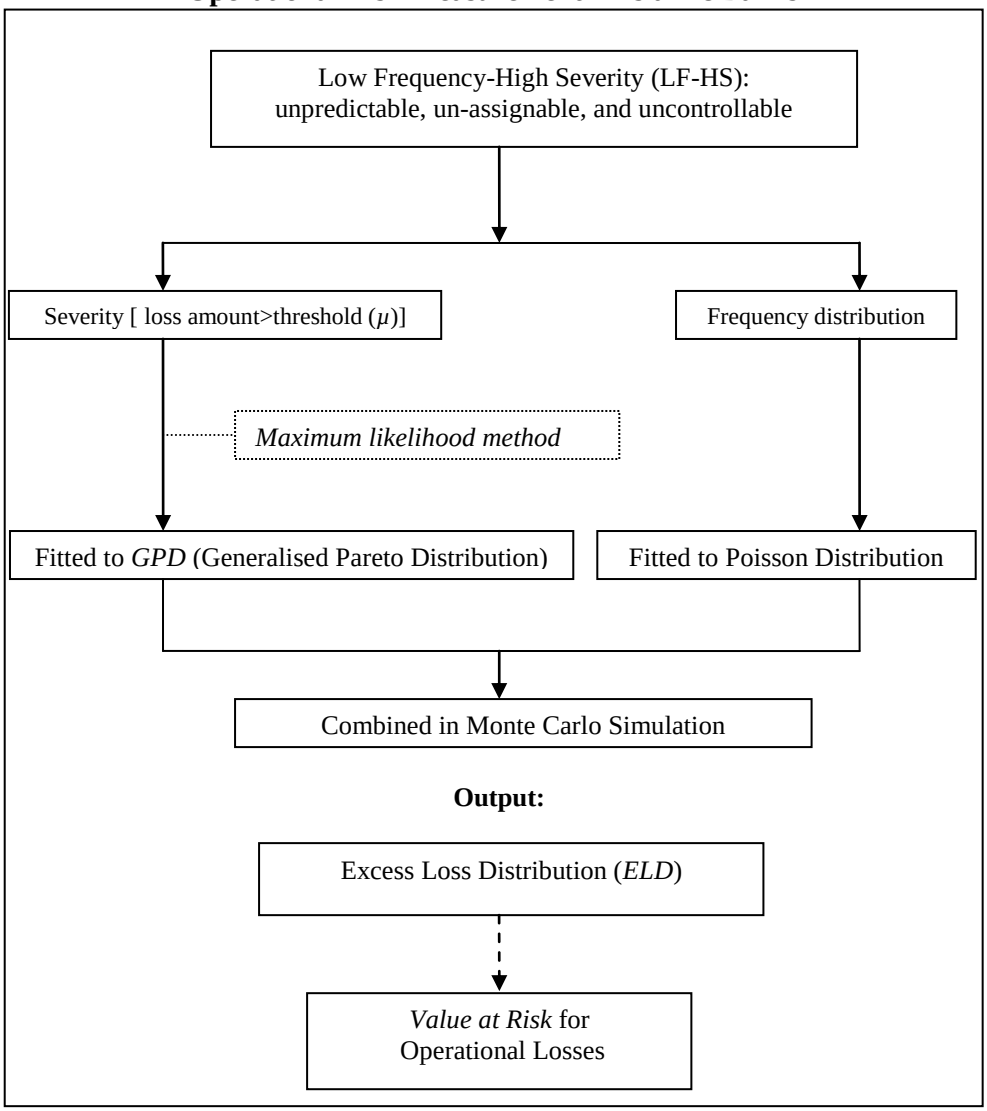
[38] V. Chavez-Demoulin, P. Embrechts, J. Neslehova, "Quantitative Models for Operational Risk : Extremes, dependence and aggregation", *Journal of Banking & Finance* (30), 2006, p. 2639

Figure-2
The Application of Extreme Value Theory for Operational Risk Measurement in Islamic Banks



6.2. Theoretical Building Blocks of EVT: Fisher-Tippet-Gnedenko Theorem

The Fisher-Tippet-Gnedenko theorem states that given a sample of independent identically distributed loss data $\{x_1, x_2, \ldots, x_n\}$, as the number of observations n becomes increasingly large, the maximum of the sequence of observations, under vert general conditions, is approximately distributed as the generalised extreme value (GEV) distribution with cumulative probability distribution function

$$F(x) = \begin{cases} exp\left\{-\left[1+\xi\left(\frac{x-\mu}{\sigma}\right)\right]^{-1/\xi}\right\} for\, \xi \neq 0 \\ exp-\left\{exp\left[-\left(\frac{x-\mu}{\sigma}\right)\right]\right\} for\, \xi = 0 \end{cases} \tag{23}$$

where μ is the location parameter, $\sigma > 0$ is a scale parameter, $1 + \xi z > 0$, $-\infty \leq \xi \leq \infty, \sigma > 0$, and ξ is the tail index parameter. The GEV has three forms; if $\xi > 0$, then the distribution takes the form of a type II (Frechet) heavy-tailed distribution. For $\xi < 0$, the distribution is takes the type III (Weibull) distribution. When $\xi = 0$, the distribution is the type I (Gumbel) light-tailed distribution. In fact, the larger the tail index parameter, the fatter is the tail.

6.3. Parameter Estimation

The parameter μ and σ can be estimated from the sample mean and sample standard deviation, respectively. If we rank the data in order size so that $x_1 > x_2 > \ldots > x_n$, the tail index parameter ξ can be estimated using the Hill estimator:

Method *I*: $$\hat{\xi}_k = \left(\frac{1}{k-1}\sum_{j=1}^{k-1} ln(x_j)\right) - ln(x_k) \tag{24}$$

Method *II*: $$\hat{\xi}_k = \left(\frac{1}{k}\sum_{j=1}^{k} ln(x_j)\right) - ln(x_k) \tag{25}$$

The problem now is how to choose k. Theory gives little advices as to what value to choose. Furthermore, the actual estimate will be sensitive to the value of *k* chosen. In practice, the average estimator, using either of the following two formulas, often works well:

Method *1*: $\hat{\xi} = \frac{1}{n}\sum_{i=1}^{n}\theta_i$ where $\theta_k = \left(\frac{1}{k-1}\sum_{j=1}^{k-1} ln(x_j)\right) - ln(x_k)$ for $k = 1, 2 \ldots, n$ (26)

$$\text{Method } 2: \hat{\xi} = \frac{1}{n}\sum_{i=1}^{n}\theta_i \text{ where } \theta_k = \left(\frac{1}{k}\sum_{j=1}^{k} ln\left(x_j\right)\right) - ln\left(x_k\right) \quad \text{for } k = 1, 2, n \qquad (27)$$

6.4. Severity Model

An alternative EVT approach to calculate OpVaR is to use peaks over threshold (POT) modelling. The underlying principle of the operating framework is to use peaks over threshold. Although the method of block maxima utilises the Fisher-Tippet-Gnedenko theorem to inform us what the distribution of the maximum loss is, POT uses the Picklands-Dalkema-de Hann to inform us what is the probability distribution of all events greater than some large present threshold. The Picklands-Dalkema-de Hann theorem states that if F_u is the conditional excess distribution function of values of the ordered losses X above some threshold, μ is given by $F_u = Prob\left(X - \mu \le y | X > \mu\right), 0 \le y \le x_F - \mu$. Then for a suitably high threshold the limiting distribution of F_u is a generalised Pareto distribution (GPD) with cumulative distribution function

$$GPD_{\xi\sigma} = \begin{cases} 1 - \left(1 + \xi\frac{x}{\sigma}\right)^{-\frac{1}{\xi}} i, \xi \neq 0 \\ 1 - exp\left(-\frac{x}{\sigma}\right), \xi = 0 \end{cases} \qquad (28)$$

where $\sigma > 0$, and $x \ge 0$ when $\xi \ge 0$ and $0 \le x \le -\beta/\xi$ when $\xi < 0$. The parameters ξ and β are referred to, respectively, as the *shape* and *scale* parameters. In other words, *ys* are called *excesses* whereas *xs* are called *exceedances*.
It is possible to determine the conditional distribution function of the excesses (i.e, *ys*) as a function of *x*:

$$F_u(y) = P\left(X - u \le y | X > u\right) = \frac{F_x(x) - F_x(u)}{1 - F_x(u)} \qquad (29)$$

In this representations the parameters ξ is crucial, when $\xi = 0$, we have an exponential distribution; when $\xi < 0$, we have a Pareto distribution—II Type and when $\xi > 0$, we have Pareto distribution—I Type. Moreover, this parameter has a direct connection with the existence of finite moments of the losses distributions. We have the following equations:

$$E\left(x^k\right) = \infty \text{ if } k \ge 1/\xi \qquad (30)$$

Hence in the case of a GPD as a Pareto—I Type, when $\xi \geq 1$, we have infinite mean models, as also shown by Moscadelli[39] and Neslehova et. al[40].

Following Di Clemente-Romano[41], we suggest to model the loss severity using the lognormal for the body of the distribution and EVT for the tail in the following way:

$$F_i(x) = \begin{cases} \Phi\left(\dfrac{\ln x - \mu(i)}{\sigma(i)}\right) & 0 < x < u(i) \\ 1 - \dfrac{N_u(i)}{N_i}\left(1 + \xi(i)\dfrac{x - u(i)}{\beta(i)}\right)^{-1/\xi(i)} & u(i) \leq x \end{cases} \tag{31}$$

Where
Φ = standardised normal cumulative distribution functions
$N_u(i)$ = number of losses exceeding the threshold $u(i)$
$N(i)$ = number of loss data observed in the ith ET
$\beta(i)$ = scale parameters of a GDP
$\xi(i)$ = shape parameters of a GDP

An important issue to consider is the estimation of the severity distribution parameters. While the estimation maximum likelihood (ML) in the lognormal case is straightforward, in the EVT case, it is extremely important to consider whether ML or the alternative probability weighted moment (PWM) routines are able to capture the dynamics underlying losses severities.

With respect to ML, the log-likelihood function equals

$$l((\xi, \beta; X) = -n \ln \beta - \left(\frac{1}{\xi} + 1\right)\sum_{i=1}^{n} \ln\left(1 + \frac{\xi}{\beta} X_i\right) \tag{32}$$

This method works well if $\xi > -1/2$. In this case, it is possible to show that

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[39] M. Moscadelli, The Modeling of Operational Risk: Experiences with the Analysis of the data collected by the Basel Committee, Working Paper, Temi di Discussione del Servizio Studi, No. 157, Banca d'Italia, Roma, 2004.

[40] J. Neslehova, P. Embrechts, and V. Chavez-Demoulin, "Infinite Mean Models and the LDA for Operational Risk", *Journal of Operational Risk,* 1 (1), 2006.

[41] A. DiClemente and C. Romano, "A copula-extreme value theory approach for modelling operational risk", in *Operational Risk Modelling and Analysis: Theory and Practice,* ed. M.G. Cruz. London: Risk Books, 2004.

$$n^{1/2}\left(\hat{\xi}_n - \xi, \frac{\hat{\beta}_n}{\beta} - 1\right) \xrightarrow{d} N\left(0, M^{-1}\right), n \longrightarrow \infty \tag{33}$$

where

$$M^{-1} = (1+\xi)\begin{pmatrix} 1+\xi & -1 \\ -1 & 2 \end{pmatrix} \tag{34}$$

Instead, the PWM consist of equating model moments based on a certain parametric distribution function to the corresponding empirical moments based on the data. Estimated based on PWM are often considered to be superior to standard moment-based estimates. In our case, this approach is based on these quantities:

$$w_r = E\left[Z\left(\overline{GPD}_{\xi,\beta}(Z)\right)^r\right] = \frac{\beta}{(r+1)(r+1-\xi)}, \quad r = 0,1,... \tag{35}$$

where $\overline{GPD}_{\xi,\beta} = 1 - GPD_{\xi,\beta,}$ Z follows a $GPD_{\xi\beta}$ (36)

From the above equations, it is possible to show that

$$\beta = \frac{2w_0 w_1}{w_0 - 2w_1} \text{ and } \xi = 2 - \frac{w_0}{w_0 - 2w_1} \tag{37}$$

Hosking and Wallis[42] show that PWM is a viable alternative to ML when $\xi \geq 0$. In our analysis, we estimated the GPD parameters using the previous approaches together with the standard Hill estimator.

6.5. Frequency Model

Having fitted a GPD to the amount of loss for a set of excess losses, the next step is to determine the frequency of losses using a Poisson distribution. The Poisson distribution is well known as a single parameter distribution for the number of occurrences of an event with relatively small probabilities given a relatively large sample. The formula for the Poisson distribution is

$$Pr(x) = \frac{\lambda e^{-x}}{x!} \tag{38}$$

[42] J.R.M. Hosking and J.R. Wallis, "Parameter and Quantile Estimation for the Generalized Pareto Distribution", *Technometrics,* 29 (3), 1987, p. 344.

Formula for Poisson distribution of x events with single parameter λ, the arrival rate. The fitting of the Poisson to a set of occurrences proceeds using the inter-arrival times for the loss events. That is, the average time between events can be used to determine the arrival rate or *lambda* for the Poisson formula. (The arrival rate is simply the inverse of the inter-arrival time). For the Poisson distribution, it can be shown that the maximum likelihood estimator for λ is given by the mean arrival rate formula below

$$\lambda = \frac{\sum_k k n_k}{n} \tag{39}$$

Formula for estimating λ for the Poisson distribution; where

k is the number of events in a period,
n_k is the number of periods with k events,
n is the total number of periods.

A goodness of fit statistic for the Poisson distribution can be found using a simple χ^2-squared test. The test statistic is:

$$\chi^2 = \sum_k \frac{(n_k - n\,Pr(k;\lambda))^2}{n\,Pr(k;\lambda)} \tag{40}$$

Chi-squared test statistic for the goodness of fit of the Poisson distribution to a set of data; where $Pr(k; \lambda)$ is the probability of k events for the Poisson distribution with parameter λ. The degrees of freedom are $n-2$.

6.6. Compounding via Monte Carlo Methods

Once severity and frequency distributions have been estimated, it is necessary to compound them via Monte Carlo methods to get a new data series of aggregate losses, so that we can then compute the desired risk measures, such as the VaR and expected shortfall.

The random sum $L=X_1+ \ldots + X_n$ (where N follows a Poisson distribution) have distribution function:

$$F_L(x) = Pr(L \le x)$$
$$= \sum_{n=0}^{\infty} p_n \, Pr\left(L \le x \middle| N = n\right)$$

$$= \sum_{n=0}^{\infty} p_n F_x^{*n}(x) \tag{41}$$

where $F_x(x) = Pr\ (X \leq x)$ = distribution function of the severities X_i
F_x^{*n} = n-fold convolution of the cumulative distribution function of X.

Hence, the aggregation of frequencies and severities is performed as a sum of severities distribution function convolutions, thus determining a compound distribution, whose density function can be obtained by:

$$f_L(x) = \sum_{n=0}^{\infty} p_n F_x^{*n}(x) \tag{42}$$

This aggregation is computed via convolution using Monte Carlo methods. It should also be noted that the convolution is a bit more complex as the severity distribution is split in two parts: the body of the distribution, which follows a lognormal distribution, and the tail, which follows a GPD. As a result, two different severity levels are generated. Hence, the probability associated at each severity (i.e., the number of observations obtained by the Poisson distribution) has to be congruent with the fact that losses may belong to the body or to the tail. Therefore, it is crucial to consider $F(u)$, where u is the GPD threshold and F is the distribution function associated to this point. After having sampled from the two severity distributions, every single loss X_i whose $F(Xi) < F(u)$ will be modeled as a lognormal variable, otherwise it will be a GPD random draw.

As shown in Figure 1 and Figure 2, value at risk is generated from both processes, *DGSA* and *EVT*. As a result, an approximation of the magnitude of operational risk is generated by adding the value at risk resulting from *DGSA* and *EVT* processes.

7. Concluding Remarks

Indeed, quantifying operational risk is a very challenging task. One of the main reasons is due to the diverse elements involved in the quantification process. Although the use of Basic Indicator and the Standardised approach in measuring operational risk exposures have been suggested by IFSB, however, both approaches are somewhat inaccurate as the suggested methods are used to calculate operational risk capital. In other words, it is a requirement to set aside a certain amount of capital to cater for operational risk. Consequently, it will not come as a surprise that such an approach will result in a high or low of economic capital number; hence, operational risk capital is over estimated or under estimated.

Nonetheless, a very essential step which is actually overlooked in the process; that is the measurement of operational risks itself. In this respect, this paper proposes an approach for the measurement of operational risk, namely *Delta Gamma Sensitivity Analysis-Extreme Value Theory*. This model is an integrated measurement method which caters for two types of operational risks, namely high frequency-low severity (*HF-LS*) and low frequency-high severity (*LF-HS*) risks. The strength of the model lies in its accuracy in measuring the causality taking place in the value adding process in Islamic banking operations. Moreover, *an elasticity based sensitivity analysis* employed in the first leg of the model would be a better alternative to the common *partial derivatives based sensitivity analysis* since it would not neglect the relative parameter changes that occur in the causality models.

The proposed *DGSA-EVT* model would also give a number advantage to the operational risk managers; first, it is a reflection of potential loss that is not merely based on actual loss figure which is rarely available. This aspect is very crucial since in most cases, operational losses are not recorded, especially in an Islamic bank. To the best of the author's knowledge, there is not any single Islamic bank which discloses publicly the magnitude of its operational losses. Second, the models reflect the quality of the operations in the banks. Thus, it can be perceived that a bank with a better model is likely to have more effective operational risk management. Third, since the error rates are relative errors based on exposures, the models are related to the size of the firm's business.

Nevertheless, the paper is theoretical and analytical in nature. Testing the proposed model, therefore, is needed to assess the workability of the model. Indeed, it is a quite daunting task considering that data availability can be a hindrance to such a test.

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APPENDIX[43]

The appendix discusses different dimensions of proposed operational risk categories (ORCs) in different types of Islamic financial contracts. As can be seen in the table below, the five dimensions of operational risk categories are Sharīʿah compliance risk (*SR*), fiduciary risk (*FR*), people risk (*PR*), legal risk (*LR*), and technology risk (*TR*). The first three dimensions are, by nature, internally inflicted; while the fourth one is naturally from external source. As for technology risk (*TR*); it can originate from either internal or external operational failures.

The Dimensions of Operational Risk Categories (ORCs) in Islamic Financial Contracts

Contracts	**Internal Risks**				**External Risks**	
	Sharīʿah **Compliance Risk (*SR*)**	**Fiduciary Risk (*FR*)**	**People Risk (*PR*)**	**Technology Risk (*TR*)**	**Legal Risk (*LR*)**	**Technology Risk (*TR*)**
Murābaḥah	• Exchange of money and commodity needs to be ensured • In the event of late payment, penalty must be avoided as it will tantamount to *ribā*.	Inability to meet the specified product stipulated in the contract	Fail to deliver the product	Incompatibility of the new accounting software	Products to be sold must be legally owned by the bank	System failures and external security breaches
Salam	• Final payment of monetary rewards must be concluded in advance • Penalty clause is illegitimate in the event of seller's default in delivering the goods • In parallel *salam*, execution of second *salam* contract is not contingent on the settlement of the first *salam* contract	• Inability to meet the specified product stipulated in the contract. • Delivery of inferior goods cannot be accepted	Mismatch in the commodity's specification due to inability of seller to provide the exact product mentioned in the contract.	Incompatibility of the new accounting software	Goods must be delivered when it is due, as agreed in the contract	Specification mismatching in commodities productions agreed in the contract
Istiṣnāʿ	• Should not be used as a	Need to ensure the quality	Inability to deliver the	Incompatibility of the new	Disagreement with the sub-	Specification mismatching

[43] This section is heavily drawn from Izhar (2010)

	legal device; e.g. the party ordering the product to be produced is the manufacturer himself • In parallel *istiṣnāᶜ*, contracts should be separated to avoid two sales in one deal	standards of the products	product on time	accounting software	contractor or the customer in the event of remedying the defects	in commodities productions agreed in the contract
Ijārah	• Need to ensure that leased asset is used in a Sharīᶜah compliant manner • In *ijārah muntahia bittamleek*, an option to purchase cannot be enforced.	Major maintenance of the leased asset is the responsibility of the banks or any party acting as lessor.	Lessor needs to understand that in the event of payment delay, rental due cannot be increased as clearly exemplified by AAOIFI	Incompatibility of the new accounting software	Enforcement of contractual right to repossess the asset in case of default or misconduct by the lessee	Losses of information on the leased assets specified in the contract due to external security breaches
Mushārakah	Profit allocation is based on actual profit, not expected profit	Inadequate monitoring of the financial performance of the venture	Lack of technical expertise in assessing the project	Incompatibility of the new accounting software	A mixture of shares in one entity may lead to legal risk if the regulation does not facilitate such action	Losses of information on the projects specified in the contract due to external security breaches
Muḍārabah	Profit allocation is based on actual profit, not expected profit	Inadequate monitoring of the business	Inability to provide regular and transparent financial performance of the project	Incompatibility of the new accounting software	Misinterpretation of civil law upon implementation of Sharīᶜah compliant *muḍārabah*	Losses of information on the projects specified in the contract due to external security breaches

Murābaḥah

Murābaḥah is "selling a commodity as per the purchasing price with a defined and agreed profit mark-up"[44]. This mark-up may be a percentage of the selling price or a lump sum. Moreover, according to AAOIFI standard, this transaction may be concluded either without a prior promise to buy, in which case it is called

[44] Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) on 'Shariah Standards', 2005.

ordinary *murābaḥah*, or with a prior promise to buy submitted by a person interested in acquiring goods through the institution, in which it is called a "banking *murābaḥah*", i.e. *murābaḥah* to the purchase orderer. This transaction is one of the trust-based contracts that depends on transparency as to the actual purchasing price or cost price in addition to common expenses.

Murābaḥah is the most popular contract in terms of its use, since most of Islamic commercial banks operating worldwide rely on this contract in generating income. Different dimensions of operational risk which can arise in *murābaḥah* transaction are as follows:

- Sharīʿah *compliance risk (SR)*; may arise if the Islamic banks give money, instead of commodity, which will then result in the exchange of money and money. This is prohibited in Sharīʿah, since the exchange of money with money, plus additional amount above the principal and paid in different time will tantamount to *ribā*. AAOIFI Sharīʿah standard also requires Islamic banks to own, legally, the commodity before they sell it to the customers. It is important to note that the sequence of the contract is very central in *murābaḥah* transaction. Inability or failure to conform with the sequence and Sharīʿah requirement will result in the transaction to be deemed illegitimate.
- *Fiduciary risk (FR)*; this risk arises due to the inability to meet the specified commodity stipulated in the contract.
- *People risk (PR)*; the risk can result from two sides, seller as well as buyer. *PR* from the seller side occurs if Islamic banks fail to deliver the specified product agreed in the contract on due date, while *PR* from the buyer side takes place when the buyers does not keep their promise to buy the commodity. This can happen in the binding *murābaḥah* contract.
- *Legal risk (LR)*; profit originated from *murābaḥah* cannot be equated with interest, although it looks similar. The main difference is because the resulting profit is tied with the underlying commodity. This might create legal problem as in certain countries, the regulators only give limitation on interest rate, not profit rate. Hence, the absence of so called 'profit rate cap' has the potential to crate legal problems if there is any dispute. Another potential problem can occur at the contract signing stage, since the contract requires the Islamic bank to purchase the asset first before selling it to the customer; the bank needs to ensure that the legal implications of the contract properly match the commercial intent of the transactions.
- *Technology risk (TR)*; may result from an incompatibility of the new accounting software or an external system failure.

Salam and Parallel *Salam*

AAOIFI Sharīʿah standards define *salam* as a transaction of the purchase of a commodity for the deferred delivery in exchange for immediate payment. It is a type of sale in which the price, known as the *salam* capital, is paid at the time of contracting while the delivery of the item to be sold, know as *al-muslam fihi* (the subject matter of a *salam* contract), is deferred. The seller and the buyer are known as *al-muslam ilaihi* and *al-muslam* or *rabb al-salam* respectively. *Salam* is also known as *salaf*. Parallel *salam* occurs when the seller enters into another separate *salam* contract with a third party to acquire goods, the specification of which corresponds to that of the commodity specified in the first *salam* contract.

- Sharīʿah *compliance risk (SR)*; one of the very central conditions in *salam* contract is that the payment of *salam* capital must be paid full in advance. If payment is delayed, the transaction is not called *salam*[45].Any delay in payment of the capital and dispersal of the parties renders the transaction a sale of debt for debt, which is prohibited, and the scholars agreed on its prohibition. Another aspect, which might lead to *SR* may also occur in parallel *salam*; this will take place if the execution of the second *salam* contract is contingent on the execution of the first *salam* contract. Penalty clause is also not allowed, in the event of a seller's default in delivering the good. The basis for not allowing penalty in *salam* is because *al-muslam fihi* (the subject matter of a *salam* contract) is considered to be a debt; hence it is not permitted to stipulate payment in excess of the principal amounts of debt[46].
- *Fiduciary risk* (*FR*); *salam* is generally associated with the agricultural sector. The buyer must either rejects goods of an inferior quality to that specified in the contract, or accept them at the original price. In the latter case, the goods would have to be sold at a discount (unless the customer under a parallel *salam* agreed to accept the goods at the originally agreed price).
- *People risk (PR)*; can arise due to a seller's default in delivering the commodity or due to the commodity's specification mismatching. Financial institutions may minimise such type of operational risks by asking from the seller guarantees that they are following a quality management system or following any standard system, or by asking for references on past promises on *salam* contract or by collateralising their losses via insurance policies.

[45] AAOIFI, 2005, p. 172
[46] AAOIFI, 2005, p. 173

- *Legal risk* (*LR*); Islamic banks may face legal risk if the goods cannot be delivered at the specified time (unless the customer under parallel *salam* agrees to modify the delivery date).
- *Technology risk (TR)*; may result from an incompatibility of the new accounting software or the system fails to specify precisely the commodities agreed in the contract.

Istiṣnāʿ and Parallel *Istiṣnāʿ*

Istiṣnāʿ is another type of forward contract, but the role of an Islamic bank as a financial intermediary differs from that in a *salam* contract. In this case, the bank contracts to supply a constructed asset (such as a building or a ship) for a customer. In turn, the bank enters into a parallel *istiṣnāʿ* with a sub-contractor in order to have the asset constructed. Its reliance on the parallel *istiṣnā* counterparty (the sub-contractor) exposes it to various operational risks, which need to be managed by a combination of legal precautions, due diligence in choosing sub-contractors, and technical management by appropriately qualified staff or consultants of the execution of the contract by the sub-contractor. Islamic banks that specialise in *istiṣnāʿ* financing may have an engineering department. Risks may include the following:

- Sharīʿah *compliance risk* (*SR*); could arise if *Istiṣnā* is being used as a legal device for mere interest based financing. For instance, an institution buys items from the contractor on a cash payment basis and sells them back to the manufacturer on a deferred payment basis at a higher price; or where the party ordering the subject matter to be produced is the manufacturer himself; or where one third or more of the facility in which the subject matter will be produced belongs to the customer. All the circumstances mentioned above would make the deal an interest based financing deal in which the subject matter never genuinely changes hands, even if the deal won through competitive bidding. This rule is intended to avoid sale and buy back transactions (*bayʿ al-ʿīnah*). In parallel *istiṣnāʿ*, the separation of contracts is a must, hence this is not an instance of two sales in one deal, which is prohibited.
- *Fiduciary risk* (*FR*); the sub-contractor may fail to meet quality standards or other requirements of the specification, as agreed with the costumer under the *istiṣnāʿ* contract.

- *People Risk* (*PR*); this may arise if the Islamic bank may be unable to deliver the asset on time, owing to time overruns by the sub-contractor under the parallel *istiṣnāʿ*, and may thus face penalties for late completion.
- *Legal risk* (*LR*); Islamic banks may face legal risk if no agreement is reached with the sub-contractor and the customer either for remedying the defects or for reducing the contract price.
- *Technology risk (TR)*; may result from an incompatibility of the new accounting software or the system fails to specify precisely the commodities that would be produced in the contract.

Ijārah and *Ijārah Muntahia Bittamleek*

In simple terms, an *ijārah* contract is an operating lease, whereas *ijārah muntahia bittamleek* is a lease to purchase. While operational risk exposures during the purchase and holding of the assets may be similar to those in case of *murābaḥah*, other operational risk aspects include the following:

- Sharīʿah *compliance risk* (*SR*); the Islamic banks need to ensure that the asset will be used in a Sharīʿah compliant manner. Otherwise, it is exposed to non-recognition of the lease income as non-permissible.
- *Fiduciary risk* (*FR*); major maintenance is the responsibility of an Islamic bank as a lessor, as directed by AAOIFI Sharīʿah standards[47]. In addition to that, it is the duty of the lessor to ensure that the usufruct is intact, and this is not possible unless the asset is maintained and kept safe so that the lessor may be entitled to the rentals in consideration for the usufruct. Thus, deficiencies in maintaining such responsibility can be deemed to be sources of *FR* in *ijārah* contract.
- *People risk (PR)*; lessor is not allowed to increase the rental due, in case of delay of payment by the lesse, this is what AAOIFI clearly exemplifies. Misunderstanding of this principle by the staff is a source of losses caused by *PR*, because the income generated from this, is not permissible from Sharīʿah point of view.
- *Legal risk* (*LR*);the Islamic bank may be exposed to legal risk in respect of the enforcement of its contractual right to repossess the asset in case of default or misconduct by the lessee. This may be the case particularly when the asset is a house or apartment that is the lessee's home, and the lessee enjoys protection as a tenant.

[47] AAOIFI, 2005, p. 154

- *Technology risk (TR)*; may occur due to an incompatibility of the new accounting software or losses of information on the leased assets due to external security breaches.

Mushārakah

Mushārakah is a profit and loss sharing partnership contract. The Islamic bank may enter into a *mushārakah* with a customer for the purpose of providing a Sharīʿah compliant financing facility to the customer on a profit and loss sharing basis. The customer will normally be the managing partner in the venture, but the bank may participate in the management and thus be able to monitor the use of the funds more closely. Typically, a diminishing *mushārakah* will be used for this purpose, and the customer will progressively purchase the bank's share of the venture. Operational risks that may be associated with *mushārakah* investments are as follows:

- Sharīʿah *compliance risk* (*SR*); the source of *SR* may arise due to the final allocation of profit taking place based on expected profit. AAOIFI commands that it is necessary that the allocation of profit is done on the basis of actual profit earned through actual or constructive valuation of the sold assets[48].
- *Fiduciary risk* (*FR*); any misconduct or negligence of the partners are the sources of *FR*. This can happen in the absence of adequate monitoring of the financial performance of the venture.
- *People risk* (*PR*); lack of appropriate technical expertise can be a cause of failure in a new business activity.
- *Legal risk* (*LR*); an Islamic bank which enters into *mushārakah* contract needs to acquire some shares from separate legal entity that undertake Sharīʿah compliant activities. A mixture of shares in one entity may lead to legal risk if the regulation does not allow doing such action.
- *Technology risk (TR)*; may occur due to an incompatibility of the new accounting software or losses of the precise information on projects undertaken due to external security breaches.

Muḍārabah

Muḍārabah is a profit sharing and loss bearing contract under which the financier (*rabb al māl*) entrusts his funds to an entrepreneur (*muḍārib*). The

[48] AAOIFI, 2005, p. 205

exposure of operational risk in *muḍārabah* is somewhat similar to that of *mushārakah.* However, since this type of contract may be used on the assets side of the balance sheet, as well as being used on the funding side for mobilising investment accounts, the operational risk is first analysed from the assets-side perspective and then from the funding side perspective (which is related to fiduciary risk)

Asset-side *Muḍārabah*

Contractually, an Islamic bank has no control over the management of the business financed through this mode, the entrepreneur having complete freedom to run the enterprise according to his best judge judgement. The bank is contractually entitled only to share with the entrepreneur the profits generated by the venture according to the contractually agreed profit sharing ratio. The entrepreneur as *muḍārib* does not share in any losses which are borne entirely by the *rabb al māl*. The *muḍārib* has an obligation to act in a fiduciary capacity as the manager of the bank's funds, but the situation gives rise to moral hazard especially if there is information asymmetry—that is, the bank does not receive regular and reliable financial reports on the performance of the *muḍārib*. Hence, in addition to due diligence before advancing the funds, the bank needs to take precautions against problems of information asymmetry during the period of investment.

Funding-side *Muḍārabah*

Profit-sharing (and loss bearing) investment accounts are a Sharīʿah compliant alternative to conventional interest-bearing deposit account. Since a *muḍārabah* contract is employed between the Islamic bank and its investment account holders, the investment account holders (*IAHs*) share the profits and bear all losses without having any control or rights of governance over the Islamic bank. In return, the Islamic bank has fiduciary responsibilities in managing the *IAHs'* funds. The *IAHs* typically expect returns on their funds that are comparable to the returns paid by competitors (both other Islamic banks and conventional institutions), but they also expect the Islamic bank to comply with Sharīʿah rules and principles at all times. If the Islamic bank is seen to be deficient in its Sharīʿah compliance, it is exposed to the risk of *IAHs* withdrawing their funds and, in serious cases, of being accused of misconduct and negligence. In the latter case, the funds of the *IAHs* may be considered to be a liability of the Islamic bank, thus jeopardising its solvency.

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Leverage Risk, Financial Crisis, and Stock Returns: A Comparison among Islamic, Conventional, and Socially Responsible Stocks

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Abstract

According to the financial press, firms with low leverage have lower distress risk due to their reduced exposure to the credit market, especially during credit crises. Compared to their conventional and socially responsible (SRI) counterparts, sharia compliant (SC) stocks are low-leverage stocks. Our hypothesis is that SC firms would be less sensitive to leverage risk and thus would be ideal for wealth preservation during declining market environment. We find that the leverage risk factor performs consistently across various categories of firms and its impact is more pronounced during the recent financial crisis. However, we also find that compared to the conventional stocks, SC stocks are also quite sensitive to the leverage factor. In contrast, the SRI class of stocks has the least sensitivity to leverage risk factor, suggesting they can be attractive for wealth preservation during credit crises.

Keywords: asset pricing, leverage, returns, financial crisis
JEL Classifications: G00, G01, G10, G11, G12, G32

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♣ Professor of Finance and Founding Director, The Hughey Center for Financial Services, Bentley University. Email: jsultan@bentley.edu. We thank Dow Jones Indexes for providing us with information on proprietary indexes. We remain responsible for all remaining errors. Please do not quote without permission.

1. Introduction

As the divine code of law, the Sharia is a code of conduct that guides business transactions for the Muslims and are based on the Qur'ān and the edicts of Prophet Muhammad (pbuh). Hence, the guidelines set forth in the Sharia become imperative to every Muslim and govern all aspects of life, whether they may be of personal, social, political, economic or financial nature. Sharia compliant (SC) stocks[1] are low-leverage stocks with high asset backing, compared to their conventional and socially responsible (SRI) counterparts. It is widely held belief that firms with low leverage have lower distress risk due to their reduced exposure to the credit market. Naturally, these firms are capable of promoting flight to safety, especially in a declining market environment.

In this paper, we examine if SC stocks have lower sensitivity to economy wide leverage risk. To this extent, we create a new leverage risk factor (LEV) on the basis of firm-specific financial leverage (total debt over assets)[2]. The risk factor LEV (defined as the return on high leverage stocks minus the return on low leverage stocks) is a non-diversifiable risk premium and therefore should be included in any multifactor asset pricing model. The evidence that high leverage requires higher risk premium can be indicative of the notion that high leverage can be value destructive, especially when equity prices are falling in a persistent fashion. The fact that Islamic stocks may have lower credit market exposure is important for wealth preservation during both good and bad times. Milly and Sultan (2012) report that Islamic stocks listed globally have outperformed conventional stocks and SRI stocks during the 2007-2009 economic crisis[3]. It would be interesting to examine how these stocks respond to the traditional risk factors (such as market risk premium, size, and value) as well as the leverage risk factor. If indeed Islamic stocks have lower sensitivity to the leverage risk factor, it

[1]Sharia compliant stocks are household names in mostly developed countries. Surprisingly, only few stocks with enough liquidity and strong balance sheet data from the emerging and Muslim countries are included in the Dow Jones Islamic Index.

[2]The leverage measure which we are using is the market value of debt to market value of assets and not book value of debt to market value of assets. Both debt to equity and debt to assets are measures of capital structure of a company reflecting the amount of fixed liabilities. The only difference being that debt to equity ratio is more specific to the overall capital used in the company while debt to assets ratio is a much broader measure.

[3]The authors used weekly data to examine the relative performance of investing in three different types of stocks –conventional, Islamic, and SRI stocks. Both in sample (Jan 2000-June 2007) and out of sample (July 2007-April 2009) mean-variance optimization indicated a portfolio with Islamic stocks generated significantly larger Sharp ratios. The authors claim that a low credit market exposure of Islamic stocks was largely responsible for the relative superior performance. The results are robust even when financial and real estate companies are removed from the sample.

would be indicative of their attractiveness for wealth preservation when investors are looking for safer assets.

In this paper, using a sample of 3704 globally traded stocks for the period January 2000- April 2009, we construct a risk factor based on firm-specific leverage and find that the inclusion of the leverage risk factor leads to a weakening of the significance of the traditional FF variables. Furthermore, we show that, in comparison to the traditional FF factors, the economic and statistical significance of the leverage risk factor is high, especially during the financial crisis. We also demonstrate that the leverage risk factor contributes to the systematic risk of a firm and represents the underlying macroeconomic fundamentals. Finally, we show that compared to the conventional stocks, SC stocks display substantially lower risk premium to traditional risk factors. We also find that similar to the conventional stocks, Islamic stocks are also sensitive to the leverage factor, thus leading us to suggest that a leveraged based screening of Islamic stocks may not be ideal for wealth preservation especially during a credit crises. An investor may want to search for other redeemable characteristics in Islamic stocks that can help preserve equity value during falling equity prices.

The remainder of the paper is as follows. In Section II, we review the link between leverage and stock returns. In Section III, we discuss the recent financial crisis to motivate the empirical model. In Section IV we offer empirical results, and the final section concludes the paper.

2. Review of Literature

A detailed analysis of the sensitivity of SC stocks to the leverage risk is tricky. In the first place, one must demonstrate that, in the context of a multifactor asset pricing model, the previous risk factors are incapable of capturing economy wide leverage risk. Once a reliable risk factor is constructed, a researcher can proceed to the next stage to investigate whether such risk factor is significant in an asset pricing model. Finally, the analysis can proceed to examine if there are differences in the way different categories of firms respond to this newly created risk factor.

Consider the following multifactor asset pricing model (Fama and French (1992))

$$(1) \qquad r_t - r_{ft} = \beta_0 + \beta_1 (r_{mt} - r_{ft}) + \beta_2 R_{t,SMB} + \beta_3 R_{t,HML} + \varepsilon_t$$

shows that excess return on a portfolio ($r_t - r_{ft}$) is explained by the sensitivity of its return to three factors: the excess return on a broad market portfolio ($r_{mt} - r_{ft}$); the difference between the return on a portfolio of small stocks and the return on a

portfolio of large stocks (SMB, small minus big); and the difference between the return on a portfolio of high-book-to-market stocks and the return on a portfolio of low-book-to-market stocks (HML, high minus low).

Our analysis thus leads us to *first* address an important question which has largely been ignored in the literature. Fama and French (1992) note thatSMB (return on a portfolio of small firms minus the return on a portfolio of large firms) and HML (return on a portfolio of high book to market firms minus return on a portfolio of low book to market firms) are statistically important in explaining the cross-section of equity returns. Subsequent work by academics and practitioners has sought to verify the effects of these factors (FF factors, from hereafter) on cross-section of equity returns (for example, see Fama and French (1993, 1995, and 1998), Liew and Vassalou (2000), Davis, Fama and French (2000), Sivaprasad and Muradoglu (2009), and Vassalou and Xing (2004)). A common finding in the literature is that value stocks earn a premium over growth stocks. Similarly there is evidence that small sized stocks earn a premium over big stocks.

These so-called empirical anomalies continue to generate controversies in the literature. For instance, are value and size premiums caused by the underlying risk factors of firms falling within these categories? Similarly, the notion of whether value and size premiums reflect incorrect extrapolation of past earnings growth by the market and subsequent correction of the mispricing errors, continues to receive attention in the literature (see Eom and Park (2008) for a recent survey).

How well do FF risk factors capture financial distress risk? Fama and French (1992) note that the combination of book to market and size describes the cross-section of average stock returns and absorb the apparent roles of other variables like leverage and E/P. The authors note that the SMB and HML factors are correlated with leverage and, therefore, adequately represent financial distress. The ability of the traditional FF factors to directly capture leverage risk is critical for asset management, especially when leverage risk becomes a source of systemic risk in the economy. The implication for an investor facing such catastrophic shocks is simple. If size and value based strategies do not perform consistently well across good and bad times, the rationale behind such investing strategy is at risk.

However, Fama and French (1992 and 1993) deal with the market leverage (assets over market value of equity) and the book leverage (assets over book value of equity), which may not directly capture the sensitivity of the firms to economy

wide leverage risk[4]. In particular, the debt market exposure of a firm is a major determinant of the distress risk that may not be directly captured by the FF factors. Furthermore, to the extent that excessive leveraging and major credit events can lead to correlated defaults, we may find that the debt market exposure is monotonically increasing in financial leverage. In essence, the resulting credit crisis produces contagion-like effects with leverage risk as being the primary catalyst. According to Fama and French (1996), if default risk becomes correlated across firms, market participants, especially workers in distressed firms, tend to avoid all distressed firms in general. We believe that this presents an ideal opportunity for volatility spillover among firms in the economy, with the extent of it monotonically rising in leverage.

Surprisingly, very few studies have empirically examined the role of leverage *risk* factor in asset pricing. Chan and Chen (1991) examine the effects of financial leverage (book value of debt and preferred stock over market value of equity) on stock returns and find a positive relationship. Unfortunately, their analysis does not investigate if factor loadings on the financial leverage can subsume the effects of HML and SMB. As Fama and French (1992) write, "It would be interesting to check whether loadings on their distress factors absorb the size and book-to-market equity effects in average returns documented here." Ferguson and Shockley (2003) write, "... a three-factor empirical model that includes factors based on relative leverage and relative distress should outperform the Fama and French (1993) three-factor model in the cross section".

An investigation into this topic is timely given the recent financial crisis when economy-wide leverage played a key role in exacerbating the risk exposure especially for the leveraged[5]financial and non-financial firms. As the subprime crisis deepened, coupled with escalating liquidity crisis, the credit market virtually dried up, limiting access to funds. The TED spread (difference between the interest rates on Eurodollar loans and short-term U.S. T-bill) rose in July 2007, then spiked even higher in September 2008, reaching as high as 4.65% on October 10, 2008. While the impact was felt mostly by the hedge funds, insurance agencies, banks, and firms directly involved in construction business and mortgage lending, the effects of the liquidity crisis also had affected the non-financial firms as well. Thus, the financial crisis in 2007-2008 had a devastating contagion-like effect on credit

[4]A combination of these two leverage factors produces the book to market ratio. See Fama and French (1992).

[5]The crisis had a major impact in September and October 2008 when there was a huge withdrawal of $144.5 billion from the money market. Major institutions like Lehman Brothers, Bear Stearns, Merrill Lynch, Fannie Mae, Freddie Mac and AIG had to bear the brunt of high debt market exposure.

risk, with leverage risk acting as the centrepiece. An analysis of the Islamic stocks and their conventional counterparts is critical from the point of view of academic as well as the practitioner community. If Islamic stocks have lower sensitivity to the leverage risk factor, then these stocks would be ideal for wealth management, especially during financial crises.

There are several studies on the relationship between leverage and stock returns. See Chou et al. (2010) for a recent survey. In one strand of the literature, leverage is positively related to stock returns, especially for weak firms with poor investment opportunities. Accordingly, as debt increases the risk exposure of such firms, investors demand a premium. Sivaprasad and Muradoglu (2009) find that leverage has a significant positive relation with stock returns. Gomes and Schmid (2009) show that equity returns are increasing in market leverage. Ho, Strange and Piesse (2008) conduct a similar study for the Hong Kong stock exchange and conclude that market leverage (Assets/Market value of equity) exhibit a significant conditional relationship with the stock returns. Bhandari (1988) performs cross sectional regressions between monthly average returns and the leverage ratios for the period 1948 – 1979 and finds that the debt equity ratio has a positive effect on stock returns. Ferguson and Shockley (2003) include relative leverage (D/E) and relative distress risk, based on Altman's *Z* score. They find that their model performs better than the three factor FF model in explaining stock returns. On similar lines, Chou et al. (2010) propose an augmented five factor model which incorporates both FF factors as well as Ferguson and Shockley factors and demonstrate that this augmented five factor model explains most of the asset pricing anomalies.

In contrast, there are several studies that offer rationales for supporting a negative relationship between financial leverage and stock returns. The debt-overhang theory (Myers, 1977) provides a convenient framework to suggest why leverage reduces equity return. Accordingly, as leverage increases, the distress risk increases, and shareholders pass up positive NPV projects. As a result, the stock price decreases, reflecting underinvestment in successful projects and a decline in firm value (Myers (1977)). Other explanations include firms substituting debt for equity especially during economic crisis when the cost of equity financing is higher than the cost of debt financing (Dimitrov and Jain (2006)); managerial preference for equity over debt because high debt payments can reduce equity returns, especially when firms do not take advantage of growth opportunities (Lang et al. (1996)); the benefit of external disciplining mechanism of debt financing (Jensen and Meckling (1976)); and a reduction of the manager's ability to waste free cash (Jensen (1986)). Overall, these studies imply that debt reduces agency costs and

managerial waste, improves disclosure, and thus reduces equity risk premium. As a result, leverage is decreasing in stock returns.

The previous discussion suggests that the leverage risk factor is important for asset pricing models. Our focus in this paper is to examine the extent to which the well-known anomalies (size and book to market effects) are resolved by directly adding leverage as a systematic risk factor. Leverage risk becomes fundamental risk especially when firms' exposure to the debt market becomes pervasive and correlated across the economy. Fama and French (1996) recognize that investors avoid financially distressed firms because distress risk is correlated across the economy. We suggest that when leverage risk becomes correlated across the economy, it has a contagion-like effect on firms in general, especially those with high exposure to the debt market. To this extent, while size and book to market factors are correlated with the leverage of the firm, they may not adequately capture the firm's direct exposure to the economy wide systemic risk due to excessive leverage. Finally, to the extent that Islamic stocks tend to have low leverage and are involved only in permissible economic activities under the guidelines of the Qur'ān and *Sunnah*, may have reduced exposure to interest rate volatility. This simple and powerful proposition has not been fully addressed in the literature. If Islamic stocks continue to act like their conventional counterparts, it only goes to reaffirm the harmful effect of *ribā* as firms take on more debt.

Our suggestion is consistent with the anecdotal evidence from the recent financial crisis when leverage risk became one of the primary drivers of the global economic crisis. There was plenty of evidence of such systemic risk in the recent financial crisis: debt markets such as the commercial paper market, the repo market, and short-term bank borrowing virtually dried up. Altogether, increased leverage of firms, especially of hedge funds, insurance agencies, banks, and mortgage companies, coupled with a liquidity crisis, took a heavy toll on the global economy.

In the next section, we discuss the link between leverage risk factor and selected macroeconomic variables such as the industrial production, unemployment, inflation, credit spread and term spread. Our intent is to draw inferences on the effects of the leverage risk factor on stock returns across various time periods.

3. Leverage risk and the financial crisis – contemporary evidence

In 2004, the US Securities and Exchange commission granted a waiver of the international standards of maximum accounting leverage ratio[6] (which was about 12) for five major securities firms – Goldman Sachs, Merrill Lynch, Morgan Stanley, Lehman Brothers and Bear Sterns.[7] Subsequently, many of the investment banks boosted their leverage ratios to as high as 30. Mortgage giants Freddie Mac and Fannie Mae had leverage levels close to 60 to 1 (2008 data), which can be very lucrative if the asset prices rise, but is disastrous when asset prices fall. A recent report[8]cites excessively high leverage ratios prevailing in the housing market and the underlying mortgage backed securities as the culprit behind the credit crisis. Towards the end of the year 2009, the global economy was afflicted with excessive indebtedness which adversely affected the worldwide economy. For example, average household sector debt increased 141 per cent of disposable income in the United States and 177 percent in the United Kingdom. Furthermore, the best known banks in the US and Europe had their leverage (assets/equity) rising to forty, sixty or even hundred times the size of their equity capital.[9]

There is a broad consensus that increased leverage affects stock returns during the financial crisis. According to the popular press[10], under normal circumstances where stock prices deviate from their underlying fundamentals, prices tend to bounce back to their intrinsic values, thereby restoring the efficiency of the equity markets. However, during a prolonged crisis, price discovery process takes longer, and stocks move away from their intrinsic values for a longer period of time. In addition, when investors are pessimistic about the financial markets, they may miss out on profitable arbitrage opportunities as prices move. In fact, due to the significant mispricing in the market, the US subprime crisis caused share prices of various US and European banks to fall and exerted immense pressure on these banks in the form of deteriorating profit margins.[11]

From a balance sheet perspective, companies reduce their leverage ratios either by selling off their assets (thereby restructuring their balance sheets) or by issuing new shares. Both of these strategies have different implications on the expected

[6]Accounting leverage is defined as assets/(assets-liabilities).
[7]Source: http://neutralobserver.blogspot.com/2008/11/understanding-financial-crisis-leverage.html
[8] This part of the discussion has been adapted from "Leverage 101: The Real Cause of Financial Crisis", Sept. 25, 2008, extracted from http://seekingalpha.com/article/97299-leverage-101-the-real-cause-of-the-financial-crisis
[9]Source: http://www.huffingtonpost.com/niall-ferguson/beyond-the-age-of-leverag_b_163872.html
[10] Source: http://sg.biz.yahoo.com/080625/67/4hbq2.html
[11] Source: http://sg.biz.yahoo.com/080625/67/4hbq2.html

returns from the investor perspective. According to James Lee, Vice Chairman of JP Morgan,[12] despite the efforts by the financial sector to augment their capital levels to as high as $300 billion, firms have not been able to bring down the leverage to pre-crisis levels.

While many financial institutions and asset managers have been deleveraging since 2008, the process might eventually diminish the ability of these institutions to produce attractive returns, especially when they are unable to grow their balance sheets. In such circumstances, as financing gets costlier, firms focus on augmenting their capital level rather than investing it. In this process – "The big get bigger and the rest get smaller"[13] – has a direct impact on the stock returns of these firms. In other words, higher leverage levels increase the risk exposure of the firms and present higher growth opportunities, which should lead to higher stock returns. In contrast, lower leverage levels shrink the balance sheet of the firm and also reduce their competitiveness, having a negative impact on the shareholder value and stock returns.

Leverage risk during the financial crisis has macroeconomic implications. Notwithstanding the de-leveraging efforts of banks and other financial institutions, as of November 6, 2009, banks in particular exhibited 40 to 1 leverage (assets over equity capital). Similarly, the deleveraging efforts undertaken by many governments have also led to adopting restrictive monetary policy, resulting in higher interest rates. However, analysts argue that increasing interest rates and withdrawing funds from the financial system may cause the economy to exacerbate the effects of the credit risk. It has also been forecasted[14] that deliberate attempts by the governments to deleverage will lead to lower wages in developed countries and a permanent unemployment of 15% to 25%. Such macroeconomic instability has the potential to push investors away from the stock and bond markets. Furthermore, an increase in the perceived risk in the financial markets would prompt investors requiring a higher risk premium, which directly affects the expected returns on these stocks. So, deleveraging could have negative effects and is expected to reduce productivity. Overall, leverage affects expected returns not as a firm specific variable but as a systematic risk factor.

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[12] Source: http://www.financialweek.com/article/20080624/REG/705337846/-1/FWDAILYALERT01

[13] As stated in a research note by James Lee, vice chairman of J.P.Morgan Chase – extracted from http://www.financialweek.com/article/20080624/REG/705337846/-1/FWDAILYALERT01

[14] As stated by Bob Chapman, "Upsurge of Global Leveraged Speculation: The Financial Crisis is not over", Global Research, November 6, 2009 – extracted from http://www.globalresearch.ca/index.php?context=va&aid=15959

4. Empirical Results

Our initial sample includes weekly data for approximately 4000stocks from 55 countries from January 2000 to April 2009. Our sample includes both financials (banks, S&Ls, credit unions, mortgage financing companies, real estate firms, and insurance companies) and non-financial firms. Since financial firms, especially banks and insurance firms, operate with high leverage, we will also separate financials from the aggregate sample to examine if financials stocks have different sensitivity to the risk factors.

We eliminate stocks having negative book to market equity from the sample in the construction of the risk factors.[15]Also, the number of stocks each year used in the construction of factors varies depending on the availability of data for the corresponding year. This eliminates the problem of survivorship bias in the sample. The data for the weekly stock returns are extracted from Datastream, while the data related to economic fundamentals like size, book to market equity and leverage are extracted from FactSet. Stock returns are in US dollar terms and are based upon log relatives of weekly stock prices. The Dow Jones Global Index is used as the market benchmark, and the US risk-free rate is used as a proxy for global risk free rate.[16] We use previous year-end fundamentals to form portfolios for each successive year; the rationale behind this is that investors use information contained in the balance sheets and financial statements to predict future returns. Investors are assumed to follow a buy and hold policy with annual portfolio rebalancing.

a. Construction of risk factors

We sort all stocks in the sample by size, book to market and leverage and categorize them in 3 groups (top 30%, middle 40%, and bottom 30%). Using the independent sorting procedure we construct value weighted portfolios formed by the intersection of three portfolios based on size, three portfolios based on book to market equity and three portfolios based on leverage (Debt/Assets). In all, we have 3*3*3=27 portfolios. The returns on these annually rebalanced portfolios create the dependent variable. In addition to the XMKT (market risk premium), the FF factors are: SMB (size mimicking portfolio constructed each week by taking the simple average of the returns on small sized portfolios minus returns on big sized portfolios), HML (book to market mimicking portfolios constructed each week by

[15] This is consistent with the portfolio formation procedure as suggested in Fama and French (1993). However, for the purpose of firm specific analysis, we consider all stocks.

[16]To avoid complications, we restrict the 3-month T-bill return to zero for the months of December 2008 and January, 2009 when intraday return on T-bills was often negative.

taking the simple average of the returns on high book to market portfolios minus the returns on low book to market portfolios) and LEV (leverage mimicking portfolios constructed each week by taking simple average of the returns on high leveraged portfolios minus the returns on low leverage portfolios).

Table 1 reports the number of stocks used for the construction of factors and portfolios each year which varies depending on the availability of data and meeting specific requirements (for e.g. positive book to market equity). The correlation matrices for the sample across the three periods are reported in Tables 2A-2C. For the aggregate period, there is a positive correlation of .45 between HML and LEV, which is expected since both these factors closely represent the distress risk of the firm. In Table 2B, for the non-crisis period, the correlation coefficients are as follows: 0.407 (LEV, HML), -.1451 (LEV, XMKT), and .205 (LEV, SMB). In Table 2C, for the crisis period, there are some interesting changes. For example, the correlation between LEV and HML increases further, and the correlation between LEV and XMKT actually turns positive. Finally, the correlation between LEV and SMB actually turns negative. Table 3 reports summary statistics for the risk factors, XMKT, SMB, HML and LEV.

b. Macroeconomic variables and factor loadings

In this section we demonstrate that the FF and leverage risk factors have macroeconomic implications. Several studies have shown that macroeconomic variables predict expected returns on stocks and bonds. See for example, Abel (1999), Fama (1981), Elton, et. al. (2001), Vassolou (2003) and Petkova (2006) and references therein. These studies show a significant positive relationship between the excess market returns and indicators of economic growth. We extend this analysis and test for the relationship between selected macroeconomic variables and returns on SMB, HML, and LEV factors.

We choose the following variables to represent the world economic environment for these globally traded stocks: growth rate in industrial production (world), unemployment rate(world), inflation (U.S.), credit spread (U.S.) and term spread (U.S.) during our sample period. Credit spread is defined as the difference in the weekly yield on Moody's AAA corporate bonds and 1 year maturity government Treasury notes. Term spread is calculated as the difference between the weekly yield on 1 year treasury notes and 3 month treasury bills. The source of the data is the FRED database at the St. Louis Federal Reserve. Monthly data for industrial production for the world and unemployment rates have been obtained

from the database of IHS Global Insights.[17] Monthly inflation rates for the U.S. are obtained from the website *www.Inflationdata.com*.

Table 4 represents the results for multivariate regressions of each of the macroeconomic variables on lagged excess market returns and returns on SMB, HML and LEV. We use three lags to extract the maximum information content of these factors. The regressions are estimated at following periodicity: monthly for inflation, industrial production growth rate, unemployment rate and weekly for credit spread and term spread. The regression model is:

$$(2) \qquad Y_{kt} = \beta_0 + \beta_1 (r_m - r_{ft})_{t-i} + \beta_2 R_{t-i,SMB} + \beta_3 R_{t-i,HML} + \beta_4 R_{t-i,LEV} + \varepsilon_t$$

where, Y_{kt} represents each of the following macroeconomic variables: monthly percentage change in industrial production growth rate, inflation and unemployment rate, weekly credit spread and term spread, and *i* represents the number of lagged terms 1 to 3 to reduce serial correlation. All macroeconomic variables have been tested for unit root and those with unit root have been differenced once to induce stationarity.

Panel A represents the coefficients and t-statistics for each of the above macroeconomic variables regressed against one lag of the independent variables. The results indicate that the leverage risk factor affects the unemployment rate and inflation (at 5% level of significance) while remains insignificant for term spread, industrial production and credit spread. In Panel B, unemployment exhibits significant sensitivity to LEV lagged one period and inflation shows significant sensitivity to LEV lagged two periods. Panel C also shows significant factor loadings on LEV for all the macroeconomic variables at different lag lengths. With respect to the other factors, SMB shows significant factor loadings for industrial production and term spread(at the first and second lags) while the impact of excess market returns on these macroeconomic variables seems to be weak. Note that HML seems to have limited ability to predict these economic variables at the first and the second lags but tends to exhibit a significant impact on these variables at the third lag (significant for unemployment and inflation). Overall, the results emphasize that the "leverage risk factor" is a systematic risk factor, though its effects on macroeconomic variables are not uniform.

These results have powerful implications for the US economy bouncing back from a severe financial crisis. First, researchers argue that "deeper the decline in

[17] (http://www.ihsglobalinsight.com/EconomicFinancialData).

GDP, peak to trough, the more rapid the post-recession rebound." A recent report[18] suggests that this is the case only if there is a significant increase in the private sector liabilities. According to the report, a 0.3% drop in employment rate requires the real GDP growth higher than 3%, which in turn requires a 5% rise in the private sector liabilities, and subsequently, has a significant impact on the level of industrial production. In fact, we have witnessed slow moving recoveries following the 1980, 1991 and 2001 recessions, with the slowness being attributed to low levels of private liabilities during these periods. This supports the positive relationship between the leverage risk factor and industrial production and a consistently negative relationship between unemployment rate and the leverage risk factor which has been documented in the earlier section.

Next, the credit spread is a representative of firm's default risk. A high credit spread indicates stringent credit markets and higher risk levels. However, the last quarter century witnessed some of the major developments in finance, for e.g. "securitisation" and introduction of "structured products" which generate cash flows from underlying pool of assets like mortgages or credit card receivables (commonly known as collateralized debt obligations). Investors relied on the major credit rating agencies like Moody's and Standard & Poor's for the acceptance of these products. The collapse of the subprime lending sector and the resulting credit crisis in 2007 and 2008 exposed a colossal failure of the credit rating agencies; which also paved the way for a near-complete closure of markets for these products. In a nutshell, the credit spreads did not reflect the true economic risk underlying the corporate debt, hence it is difficult to establish a true empirical relationship between the leverage risk factor and the credit spread variables.

Notwithstanding the previous discussion, we find a positive relationship between LEV and the credit spread (see Table 4, Panel C). This is consistent with the evidence that the firms hit hard by the credit crisis were those that relied heavily on debt to finance growth like Home Depot, Toyota Motor and FedEx.[19]Stock prices of these firms, including investment banks like Citigroup and UBS AG, plummeted during the recent market meltdown. Bear Stearns and American Home Mortgage are notable examples of firms which were coerced to sell their holdings at far below their book values. In general, there was a continuous re-pricing of risk in the stock market and stock prices plummeted. In contrast, the US treasury yields were falling due to flight to safety, while the rates on mortgage debts failed to decline at the same pace. This resulted in higher credit spreads

[18] Source: http://www.lombardodier.com/annexes/23056/23074/Investment_Strategy_Bulletin_06.10.09.pdf, "*Is de-leveraging an obstacle to recovery?*"

[19] http://www.wikinvest.com/concept/2007_Credit_Crunch

because mortgage debts were most risky and demanded a premium over Treasury bonds. Thus, the positive relationship between leverage risk factor and the credit spread as seen in Table 4 is plausible since both the variables are representative of the increased exposure of the firm to distress risk caused by over leveraging.

Finally, when inflation is uncertain, investors demand inflation risk premium. Inflation induces volatility in the returns on debt and hence there is a leverage risk premium. Whether the relationship between inflation and leverage risk premium is positive or negative depends on the interaction between inflation, taxes (corporate tax and personal tax), expected return on assets, and the amount of debt used in the project. According to Armitrage (2005), as inflation increases, the real tax adjusted weighted average cost of capital decreases because higher inflation alleviates the corporate taxes on the firms' real profits and increases the tax advantage on debt. However in the presence of personal taxes, higher inflation causes an increase in the tax rates on real returns to debt. This increases the leverage risk of the firms which are heavily dependent on debt and thus demand a premium over firms which rely less on external debt. For our sample, we find mixed evidence (positive and negative) of the relationship between inflation and the risk factors (See Table 4).

c. Explaining cross-section of returns

In this section, we present our regression results by including leverage factor as a systematic risk factor. First, we test for the significance of the FF risk factors. Next we add LEV to the regression model to compare results across three periods: January 2000 –April 2009 (aggregate), January 2000 – June 2007 (non-crisis), and July 2007 – April 2009 (crisis)[20]. To check on the robustness of these results, we will further classify firms into two groups: financial and non-financial. Financial firms include all financial institution as well as real estate and mortgage firms. The popular adage is that leverage is a two-way sword. It magnifies returns in an up market and magnifies losses in a down market. Finally, we test our main hypothesis that Islamic stocks would be less sensitive to the leverage risk factor than conventional and socially responsible stocks. Our primary rationale is that low leverage of Islamic stocks would lessen the interest rate exposure of these firms.

[20]We split the periods to specifically test the impact of LEV factor during the non-crisis and the crisis period. Given the fact the overleveraging leads to increased risk exposure in the economy, we believe that this part of the systematic risk was not captured fully by the traditional FF factors. This leads us to conjecture that LEV factor has more direct implications for the performance of the stocks during the recent credit crisis and hence we expect the LEV factor to exhibit stronger effects during this period.

We use the following firm-specific GARCH model:

$$(3) \qquad r_t - r_{ft} = \beta_0 + \beta_1(r_{mt} - r_{ft}) + \beta_2 R_{t,SMB} + \beta_3 R_{t,HML} + \beta_4 R_{t,LEV} + \varepsilon_t$$

$$(4) \qquad \varepsilon_t \,|\, \psi_{t-1} \sim N(0, \sigma_t^2),$$

$$(5) \qquad \sigma_t^2 = \Omega + \sum_{i=1}^{q} \alpha_i \varepsilon^2{}_{t-i} + \sum_{j=1}^{p} \delta_i \sigma_{t-j}$$

where r_t - r_{ft} in the mean equation is the weekly excess return on asset i, r_{ft} is the weekly risk free rate (US T-bill),r_{mt} - $r_{ft}$is the market risk premium (XMKT), and SMB, HML and LEV are Fama-French factors and the leverage risk factor, defined earlier. The variance equation (5) models the conditional variance as a GARCH(p,q) process where p and q denote the lag length. Ω is the intercept term, α is the ARCH term and δ is the GARCH term. α and δ terms are expected to be positive and significant determinants of the conditional variance of changes in the excess return. The primary reason for using the GARCH model is that preliminary diagnostics suggest that the weekly excess returns have time varying variance with volatility clustering and fat tails. The GARCH models are estimated using the Bollerslev-Wooldridge (1992) corrections to deal with excess kurtosis. As noted earlier, standard t-statistics based inferences in the presence of excess kurtosis in the residuals are asymptotically invalid because standard errors are biased downward, leading to false acceptances.

d.1 Factor loadings at the firm level

We test the above model at both the firm and portfolio level for all 3,707financial and non-financial firms. Each week from January 2000 to April 2009 we run cross sectional regressions of weekly excess stock returns on XMKT, SMB, and HML factors. Next, we add LEV to test for its significance in addition to the market factor and the Fama-French factors. For robustness check, we test for the partial F-statistics of LEV to see whether this additional factor contributes significantly in explaining the cross section of expected returns (in addition to the market factor and the traditional FF factors).

Tables 5 exhibit the summary of the impact of XMKT, SMB, HML and LEV factors on the returns of firm and portfolios. Model 1 is the traditional FF case and Model 2 includes the LEV factor in addition to the FF factors. As shown, we have 3707 stocks in the sample. Note that in Table 5 and subsequent tables, we only include regression results that are significant at least at the 5% level. In Panel A,

the results show that for the aggregate period (2000-2009), in 3,304 instances XMKT is positive. A positive sign for the XMKT is consistent with the single factor CAPM model. The distribution of the SMB is about half positive and half negative. The HML is positive in 1,539 and negative in 216 cases. When LEV is added to the model (Model 2), we find that, there is a .24% increase in the number of cases ((3312/3304)-1) where XMKT is significant. With the addition of LEV, there is a 2.54% increase in the number of cases where SMB is significant. Surprisingly, the number of cases HML is positive and significant drops by 16.58%. Finally, in 2,208 instances, LEV is positive, though in 125 instances it is negative.

The results (Panel B) for the non-crisis period (2000-June 2007)are similar. The number of cases where the factors is significant changed as follows: .39% (XMKT), 1.83% (SMB), and -2.05% (HML). With regard to positive and negative impact of the factors on stock returns, there are some changes compared to the aggregate period (Model 2). For example, SMB, the number of negative cases is now 680, representing a 40% decline from the previous model. In contrast, HML, now has 539 instances for which the coefficients are negative, indicating a 17.43% increase from the previous value. Finally, we have 862 instances of positive and 149 cases of negative coefficients for LEV. It appears that, compared to Model 2 (aggregate period), there is a large number of instances the regression coefficients are insignificant. Altogether, the number of significant cases drops by 56%, suggesting that the LEV factor is able to capture systemic risk in the economy across good and bad times quite well.

However, the contribution of LEV in capturing leverage risk is evident when we estimate firm-specific regressions for the crisis period (Panel C). During July 2007-April 2009, compared to the non-crisis period, there is a 201.07% increase in the number of the cases where LEV is significant. This increase is indicative of several stylized facts during the escalating financial crisis afflicting the global economy. It appears that the credit crisis had a contagion-like effect, impacting firms across all spectrums of leverage. In essence, firms were hard hit especially when access to the debt market was severely limited because of reluctance among financial institutions to lend. The results suggest that for 3,038 firms, the sensitivity to LEV is positive and significant. Only in 66 cases the variable has negative coefficients. Compared to the non-crisis period, the addition of LEV during the credit crisis leads to a change in the number of significant cases for the remaining factors: XMKT (-84.91%), SMB (-14.97%), and HML (-27.54%). In particular, the number of negative coefficients for HML is higher than the positive ones, indicating that during the recent credit crisis, a value based investment strategy would have earned

investors negative risk premium. Again, it supports the notion that the HML may not have been a good proxy for the distress risk during this period.

d.2 Factor loadings at the portfolio level

Table 5 also the highlights portfolio-specific regressions (Panels D-F) for the three periods. Based on the intersection of these three factors, we have 27 portfolios with annual rebalancing. The results reconfirm our earlier finding that the addition of LEV weakens the significance of the traditional FF factors. For the aggregate period (Panel D), we find that LEV is significant and positive for 19 out of 27 portfolios. The number drops to 17 when we estimate the model for the non-crisis period (Panel E). In contrast, we find that in all cases, LEV is positive and significant during the crisis period (Panel F). We also note that, in comparison to the aggregate period, there is a 100% reduction in the number of cases XMKT is significant during the crisis period. For the remaining variables, percentage change in significance is as follows: SMB (-41.67%) and for HML (-43.48%), indicating an across the board weakening of the FF factors during the financial distress. In contrast, there is a 35% increase in the number of instances where LEV is positive and significant.

Overall, the FF factors seem to lose their significance when LEV as a systemic risk is included in the model. In particular, during a financial crisis period, sensitivity to LEV at the firm and portfolio level suggests that the traditional FF factors may not be adequately capturing the effects of economy-wide distress arising from excess leverage. Therefore, sensitivity to this systemic risk translates into additional risk premium that is not adequately captured by the FF risk factors.

Portfolio-specific regression results across aggregate, non-crisis and crisis periods are provided next in Tables 6-8 to highlight the magnitude of the coefficients and to check for robustness of adding LEV. In Table 6, there are several stylized facts for the aggregate period. First, there is a noticeable increase in the adjusted R^2 when LEV is added as an explanatory variable. Second, as reported earlier, with the addition of LEV in Model 2, the traditional FF factors tend to lose their statistical significance. Finally, we find that in many instances, the coefficient of HML actually turns negative.

In Table 7, we report the results for the non-crisis period and the results indicate that while the variable LEV is an important explanatory power, its addition makes only marginal impact on Model 2. There is an increase in the adjusted R^2 but by a small margin. In contrast, during the crisis period (Table 8), the addition of the

LEV makes a substantial contribution to the overall forecast ability of Model 2. The adjusted R^2 increases by a considerable margin. In addition, the size of the coefficients across the 27 portfolios is large, ranging from 1.56% (portfolio #7) to 4% (portfolio #18). The magnitude of the coefficients indicates the heightened sensitivity of firms to the economic distress during the period. As indicated earlier, the results indicate that our leverage risk factor performs quite well in representing systemic risk in the global economy. Also note that the number of negative significant coefficients for HML increases considerably (from 5 to 12)[21] which suggests that the value based investment strategy may not with falling equity prices. In contrast, LEV has a positive relationship with stock returns for all 27 portfolios, suggesting that investors demand a premium for investing in high leverage portfolios during the credit crisis.

d.3 The negative effects of leverage risk factor on stock returns

In a number of cases (see Tables 5-8), leverage risk has a negative effect on stock returns, which is consistent with several existing studies. For example, Penman et al (2007) decompose the book to price ratio of a firm into two components. The first component is the enterprise book to price (which represents the operating risk of the firm), measured as the ratio of book value of operating assets to their market value. The second component is the financial leverage component (which represents the financing risk of the firm), measured as the ratio of market value of debt to market value of equity. The authors find that enterprise book to price ratio has a significant positive relationship with the expected stock returns while the "leverage" component of book to price ratio has negative relationship with the expected stock returns. Johnson (2004) documents a negative relationship between leverage and cross section of expected returns after controlling for firm specific characteristics like volatility. See Arditti (1967), Dimitrov and Jain (2006) for similar results. In particular, Dimitrov and Jain (2006) note that during economic distress, raising equity is costlier than debt (e.g., bank financing or line of credit), so firms would prefer to increase leverage. So, falling equity returns during economic distress and rising leverage support the empirical finding that leverage and return on equity may be negatively correlated.

Managerial preference for debt over equity financing is also related to the value of the firm and its future prospects. Lang et al. (1995) find a negative relationship between financial leverage and future growth of a firm. The authors emphasize that the negative relationship between leverage and growth is more visible for firms

[21]See Table 5.

with a low Tobin's q since these firms are characterised by negligible growth opportunities not recognised by the capital markets. The study further rationalises that managers of firms with considerably lucrative growth opportunities generally do not opt for a high leverage[22] because high interest payments on debt tend to erode the profitability of the firm which prevents the firm from utilizing the benefits of these growth opportunities. Hence, a negative relationship between leverage and growth seems rational, which implies a negative relationship between leverage and stock returns.[23]

The negative effect of leverage on return on equity is also consistent from a corporate governance perspective. Jensen and Meckling (1976) suggest that increased debt levels have direct implications on the cash flow of the company by enforcing regular interest payments on debt which controls managerial expropriation. Fama and Jensen (1983) explain that increased debt levels adds to the default risk of the firm and affects the manager's reputations adversely in case the firm defaults on its interest payments or debt. This imposes a constraint on manager expropriation and leads to better corporate disclosures. In addition, Jensen (1986) suggests that leverage increasing transactions such as LBOs, new debt issues (bonds), and stock repurchase reduce the manager's access to free cash, thus reducing their waste. He further suggests that debt reduces the agency cost. This implies that as leveraging increases, external monitoring increases, and managerial efficiency is expected to rise. Furthermore, this may be imply that as firms become efficient, shareholders demand less risk premium for leverage, and as a result, stock prices fall with higher leverage.

Consistent with the above discussion, there are also more instances of significant negative coefficients for LEV during the non-crisis period (which was a period with profitable investment opportunities in the market). For example as reported in Table 5, there are 149 cases of negative coefficients on LEV (Model 2, Panel B) during the non-crisis period, but the number reduces to 66 during the crisis period (Panel C). At the portfolio level (Panel F), compared to the non-crisis period (Panel E), the number of negative coefficients for LEV reduces from 3 to 0.

[22] According to the study, managers choose leverage on the basis of the private information about the future growth prospects and hence, the financial health of the firm.

[23]Furthermore, a firm with low leverage (having low Tobin's q and insignificant growth opportunities) are harder hit during distress periods as compared to firms with higher leverage ratios (with major growth prospects and positive NPV projects). This also explains a negative relationship between credit spread and firm's leverage.

d.4 Leverage and investment strategy

These results have investment implications that suggest investing in highly leveraged firms. However, an investor needs to decide between excessively high leverage level and the negative effects of leverage on financial distress (Luoma and Spiller (2002)). See Bris and Koskinen (2002) for further evidences. A recent report[24] elaborates that the regular interest payments on debt for those companies which fund their investments through debt tend to erode the cash flow levels of the company by adding to the operating expenses of the firm. The flip side of the argument is that a firm with highly profitable growth opportunities and with a strong cash flow position would still earn a higher return on equity since they yield high profit margins. The report claims that a period of economic recovery is characterized by a strong economic momentum which bolsters earnings potentials of levered firms. The rationale behind this is that debt is cheaper for firms with promising growth prospects, and such they perform at the peak levels when debt is easily available[25]. The economic recovery in 2003 provides strong evidence to this fact when the federal funds rate was approximately 1.25%, which in turn stimulated economic growth to jump from1% to 7%. During this period, levered companies, high yield bonds and bank loans yielded attractive returns[26].

These results do not suggest that as efficiency increases, stock price decreases. Rather, as firms become more efficient, debt becomes cheaper and such companies can afford to have high debt levels in their capital structure (thereby decreasing the overall cost of capital) without increasing their credit risk. Due to lower risk levels, investors do not need additional compensation for excessive leverage as in the case of firms which are not efficient. Also, in efficient markets, due to strong corporate governance principles and better disclosures, the probability of insider information is reduced and information of the company is quickly reflected in the stock prices. Hence there is no scope for mispricing or arbitrage opportunities; so returns fall.

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[24] Source: "How leverage can increase a company's return on equity", Putnam Spectral Funds, extracted from: http://www.putnam.com/spectrum/return-on-equity.htm

[25] However the risk substantially increases with the excessive use of debt since the firm is under a pressure to service its debt on a regular basis. In addition, during economic distress, the assumption that debt is available at a lower cost may not hold true. The recent credit crisis of 2007 presents plentiful evidence where debt became costly. In fact, a firm which undertakes risky projects may not enjoy the low cost of debt because the riskiness of its operations may require the debt holders to be paid a higher interest.

[26] Source: "How leverage can increase a company's return on equity", Putnam Spectral Funds, extracted from: http://www.putnam.com/spectrum/return-on-equity.htm

d.5 Leverage risk of financial and real estate firms

We perform additional robustness tests by separating the financial stocks in the sample from the non-financial stocks[27]. Such an examination is critical because it removes industry-specific effects of the credit crisis since the effects may not have been uniformly distributed among financial and non-financial firms. Financial firms included in the sample include banks, S&Ls, credit unions, mortgage financing companies, real estate firms, and insurance companies. Clearly, these firms bore the brunt of the credit crisis due to over speculation, deregulation, and over leveraging. Were-construct FF and LEV factors and estimate firm[28] and portfolio-specific regressions using two separate samples of firms: the first sample with 645 financial stocks and the second sample with 2,975 non-financial stocks.

A summary of the regression results are reported in Panels A-F, Table 9. In Panels A-C, there is evidence that the leverage risk factor performs well across the three periods, especially during the crisis period. The results support the hypothesis that the addition of LEV weakens the significance of the traditional FF factors. For the aggregate period (Panel A), LEV is significant and positive for 17 out of 27 portfolios. During the non-crisis period (Panel B), the significance of LEV drops, we now have 14 positive and 4 negative instances. During the crisis period (Panel C), in 23 out of 27 cases, LEV is positive and significant. Note that, in comparison to the non-crisis period, there is a -85.19% change in the number of cases XMKT is significant during the crisis period. For the remaining risk factors, the change in significance is as follows: SMB (-5.26%) and HML (-59%), suggesting a weakening of the FF factors during the financial distress. In contrast, there is an increase of 27.78% in the number of instances where LEV is positive and significant during the crisis period.

In Panels D-F, we report a summary of statistically significant results for the non-financial firms in the sample. We confirm our previous findings that the addition of LEV weakens the significance of the traditional FF factors considerably. For the aggregate period (Panel D), LEV is positive in 16 out of 27 portfolios. During the non-crisis period (Panel E), in 14 instances LEV has positive and significant coefficients, and in 4 instances the coefficients are negative and

[27]It is believed that financial firms exhibit different characteristics as compared to non-financial firms and hence show different sensitivities to the risk factors. For instance, high leverage for a financial firm has different implication as compared to a non-financial firm with high debt levels. This further rationalizes the idea of conducting a robustness check by separating out financial firms from the sample.

[28]Firm-specific regressions are not reported to conserve space. They are available on request.

significant. Similar to our earlier findings, in 27 out of 27 cases, LEV is positive and significant during the crisis period (Panel F). In comparison to the non-crisis period, there is a -100% change in the number of cases where XMKT is significant during the crisis period. For the SMB, the number of significant cases changes by -39.13% and for HML, the number of significant cases changes by -57%, confirming the fact that the power of the FF factors weakens during the financial distress. In contrast, there is a 50% increase in the number of instances where LEV is positive during the crisis period.

Details of these portfolio-specific regressions across aggregate, non-crisis and crisis periods have also been analysed to demonstrate the contribution of the LEV on a case by case basis[29]. The results can be summarised as follows: first, there is a noticeable increase in the adjusted R^2 when LEV is added as an explanatory variable, indicating increased forecasting power of Model 2 during the aggregate period. Second, as reported earlier, with the addition of LEV in Model 2, the statistical significance of the traditional FF factors tend to weaken. Finally, we find that in many instances the coefficient of HML actually turns negative. During the non-crisis period, the addition of LEV to the model makes only marginal impact on the forecast power of the Model 2. The adjusted the R^2 changes by a small margin. In contrast, we find that during the crisis period, the addition of the LEV makes a substantial contribution to the overall forecast ability of Model 2. The adjusted R^2 increases by a substantial margin. Furthermore, the size of the coefficient for LEV across portfolios is large, similar to the results reported earlier. The magnitude of the coefficient clearly indicates an increased sensitivity of firms to the economic distress. Similar results have been obtained for non-financial stocks also.

Overall, we find that financial and non-financial categories of stocks have similar exposure to the debt market, despite the fact that the concept of leverage and its use varies across these two categories of firms. It again reinforces the notion that the financial crisis had a contagion-like effect on all types of firms. It also establishes the fact that our leverage risk factor is able to capture economy-wide risk from over leveraging during the financial crisis period.

d.6 Test for robustness

Earlier, we reported that the correlation between LEV and HML as follows: .45 (aggregate period), .40 (non-crisis period), and .51 (crisis period). These correlations may be viewed as high, raising a criticism that LEV factor may be

[29] The tables demonstrating the detailed results will be available on request. They have not been shown in the paper in order to conserve space.

collinear with HML, and as such, rendering the effects of HML insignificant in majority of the cases. We argue that while HML and LEV are both balance sheet variables and are therefore should be correlated, they do not represent similar risk factor in the economy. That is to say that HML does not represent LEV and LEV does not represent HML. Both are capturing economy wide risk. However, while HML is supposed to be capturing distress risk (Fama and French 1993)), it does not adequately capture systemic risk of firms when their exposure to the debt market rises due to economy-wide problems with over leveraging. To this extent, LEV adds unique information to the model and does a good job in capturing systemic risk related to the over exposure of firms to the debt market.

While a correlation of .51 may not be indicative of multicollinearity, it is important to examine if these results are robust to such statistical artefact. In the present context, we do not find a glaring evidence of multicollinearity because it would have been reflected in high F-statistics with insignificant t-statistics for the estimated coefficients.

Despite the fact that multicollinearity is not an issue, we decided to estimate the partial F-statistics to check the robustness of these results to multicollinearity. The partial F-statistic determines the incremental explanatory power of adding additional variables to the basic model. In the present context, a significant partial F statistic (critical value is 3.32 at the 1% significance level) provides justification for adding LEV to the model containing the traditional FF factors.

Table 10 reports the partial F-statistics (across all the three groups - all stock portfolios, financial stocks only portfolios, and non-financial stock only portfolios) for the aggregate, non-crisis, and crisis periods, respectively. For the combined stock portfolios, the partial F statistic is significant in 22 out of 27 portfolios during the aggregate period. During the non-crisis period, the number of cases of significant partial F statistics is reduced to 18. Similar results can be seen for financial and non-financial stock portfolios during the aggregate and the non-crisis period. However, the effect of LEV is predominantly high during the crisis period with significant partial F statistics in 27 cases for combined and non-financial stock portfolios, and in 26 cases for financial stocks only portfolios. This supports the evidence presented earlier suggesting that compared to HML, LEV incorporates additional and unique information concerning distress risk exposure of the firms. In particular, the effect of LEV is particularly dominant during the crisis period.

d.7 Factor loadings by types of firms

Previously, we noted that LEV is a good proxy for distress risk across financial and non-financial stocks. We find that stocks have similar sensitivities to the leverage risk factor. In this section, we further conduct an additional robustness check to examine whether there are differences in the way various categories of firms respond to the economy wide risk factors because they are classified by stock exchanges as meeting desired criteria for various style of investing. For instance, the Dow Jones classifies investing in certain stocks (popular household names) under broad categories such as socially responsible investing because these firms promote social, environmental, and corporate responsibility. To this extent, we consider conventional, Islamic and Socially Responsible Investing (SRI) stocks, where each group exhibits distinct characteristics[30]. There are distinct differences among these groups with respect to the fundamentals such as size, ROA, ROE, leverage, return on capital, PE ratio, and EPS. (See Milly and Sultan (2012) for further evidences.)

We use stocks included in the Dow Jones Islamic Index (DJIM) which is a proprietary index of stocks classified as Islamic stocks by the Dow Jones Sharia Board. Because of proprietary nature of such classifications, the names of the stocks are withheld though some of the common household names in the US may be classified as Islamic stocks because they meet the requirements set by the Dow Jones Sharia Board. On October 29, 2010, the market capitalization of the Dow Jones Islamic World Index was $20 billion with 2,369 stocks. The weights (%) for some of the major countries in the index are as follows: US (50.54), UK (6.71), Japan (5.42), Canada (5.27), Switzerland (3.45), Australia (3.26), France (2.97), India (2.5), Taiwan (2.2), Germany (1.73), South Korea (1.56), Brazil (1.5), Russia (1.47), China (1.39), Hong Kong (1.25), and Sweden (1.09). Among some of the traditionally Muslim majority countries, the weights are: Malaysia (35), Kuwait (22), Qatar (08), UAE (03), and Bahrain (01).

Our selection of SC stocks is in line with the recent interest in the performance of faith based investing, with its overarching goal to promote the betterment of society, relative to conventional investment strategies, which lack such ethical ambition. SC stocks are popular among a new class of investors that, in addition to profit motives, is also driven by their desire to live ethically and invest morally. Compared to the conventional Western financial system, Islamic finance is a newcomer to the global financial world, encompassing somewhere between $750

[30]We thank Dow Jones for providing us with the proprietary list of stocks classified as conventional, Islamic and SRI stocks.

billion to $1 trillion of investments in firms and projects that are classified as SC. Yet, over the past few years Islamic investments have become more competitive and consequently attractive not only to Muslim but also non-Muslim investors seeking alternative investments opportunities, which live up to high ethical as well as nominal performance standards. As a result, the number of Islamic mutual funds and exchange traded funds world-wide has increased considerably from merely 8 before 1992 to more than 300 in 2008, with an estimated market capitalization of $300 billion and numerous traditional US financial institutions joining to partake in this development.

Similarly, the SRI class of stocks is a relative newcomer, which has gained popularity in recent years. In the early 2000s, we have seen a dramatic interest in socially responsible investing that poured billions of dollars into companies known for their efforts to offer ethical investments and projects that promoted environmental sustainability. In terms of the portfolio allocation and structure, Islamic and socially responsible investing (SRI) stocks exhibit strong similarities, whereas conventional stocks are not subject to any other qualitative or quantitative constraints. Although SRI funds were initially conceived in a religious context as well, socially responsible investing has expanded to take in consideration "the so-called 'triple bottom line', commonly known as the 'three P's rule: people, planet and profit'"(Forte & Miglietta, 2007, p. 3). Most recently, assets under SRI management were estimated to have increased "from $639 billion in 1995 … to $2.71 trillion in 2007", while "assets in all types of socially and environmentally screened funds [… in the US] rose to $201.8 billion." (2007 Report on Socially Responsible Investing Trends in the United States, 2008, p. ii) The premise of the "three P's rule" is reflected in a definition of socially responsible investing, which can be found in the *2005 Report on SRI Trends in the United States* released by the Social Investment Forum:

Socially responsible investing (SRI) is an investment process that considers the social and environmental consequences of investments, both positive and negative, within the context of rigorous financial analysis… It is a process of identifying and investing in companies that meet certain standards of Corporate Social Responsibility (CSR) (2004Report on Socially Responsible Investing Trends in the United States. 10 Year Review, 2005, p. 2).

The congruence of Islamic and SRI stocks stems from the fact that both do not have profit maximization as their sole objective, but rather strive to achieve a paramount, ethical obligation and a social-utilitarian function. In the case of Islamic funds, the religious responsibilities and regulations outlined in the Sharia,

take precedence over profit in order to further the establishment of a just and moral Islamic economic system and ultimately society.

In contrast, profit maximization is the dominant objective in traditional fund management. Conventional equity portfolio strategies include neither positive nor negative screens, whose purpose it is to align the portfolio with certain ethical, qualitative standards. As such, conventional funds are not subject to the qualitative screening procedures that are so imperative to Islamic and SRI funds. Additionally, Islamic funds differ from SRI and conventional ones, since their provisions incorporate quantitative screens that are directly based on ethical paradigms found in the Sharia. Furthermore, Islamic funds have to comply with certain income purification requirements, which are derived from the teachings of the Holy Qur'ān and *Sunnah*.

The hypothesis tested is that high leverage increases exposure to the credit market and subsequently translates into shareholders demanding higher risk premium. Recall that Islamic stocks have low leverage, they are significantly more asset-backed than conventional firms, and are not involved in the business of speculation, production of weapons, alcohol, pork, and entertainment. More specifically, Islamic funds typically screen out companies with excessive reliance on debt, where the typical maximum level of total debt to market capitalization is set at 33 percent[31].

The first step towards applying our leverage risk factor to these index classifications is to recreate the FF and LEV specific to each category of stocks. This is followed by estimating GARCH regressions at the firm and portfolio level.

d.7a Factor loadings of Conventional stocks

In Table 11, we report a summary of firm and portfolio specific regressions by groups. The first panel reports the results for the firms belonging to the conventional stock category. We find that at the firm level, the inclusion of LEV produced some interesting results. Compared to the aggregate period, the number of instances where the XMKT is significant drops by 79.57% at the firm and by 100% at the portfolio level. The change in significance for SMB is as follows: 8.89% at the firm and -17.39% at the portfolio level. The results for the HML are

[31] Specifically, the debt ratio (short-term plus long-term debt as a percent of market capitalization) must not exceed 33%, interest income should not represent more than 5% of total revenue, the ratio of accounts receivables to total assets does not exceed 45%, and the ratio of cash and interest bearing securities to market capitalization does not exceed 33%. See Dow Jones website for more.

consistent across both the firm and the portfolio level. The number of instances where HML is significant at the firm level drops by 56.13% and by 44.44% at the portfolio level. Finally, the number of instances LEV is significant increases by 231% at the firm and by 58.82% at the portfolio level. Overall, these results are qualitatively similar to the ones reported earlier and confirm our earlier finding that the inclusion of LEV subsumes the effects of the traditional FF factors to a great extent.

d.7b Factor loadings of Islamic stocks

Panel B reports the results for the Islamic group of stocks. Compared to the aggregate period, there is a remarkable change in the number of cases of where XMKT is significant (-87.6% at the firm and by -92.59% at the portfolio level). The change in significance for SMB is as follows: 9.89% at the firm and -44.44% at the portfolio level. The results for the HML are again consistent across both the firm and the portfolio level. The change in statistical significance for HML is as follows: -56.44% at the firm and by -60% at the portfolio level. Finally, the number of instances LEV is significant increases by 98.9% at the firm and by 73.33% at the portfolio level. Again, our results are quite consistent with the previous results reported without the index classifications. Islamic stocks behave similar to the conventional stocks when it comes to sensitivities to economic risk factors.

d.7c Factor loadings of SRI stocks

In Panel C, we report the results for 238 stocks classified as SRI group of stocks. Compared to the previous groups, we have some unusual results. We find that, compared to the aggregate period, the number of instances where the XMKT is significant drops by 89% at the firm and by 100% at the portfolio level. For SMB, the changes in the number of significant cases are: -66% (firm-level) and -80.95% (portfolio-level). In contrast to our previous results, the number of instances where HML is significant at the firm level increases by 56.43% and by 35% at the portfolio level. Finally, the number of instances where LEV is significant drops by 11.11% the firm and by 56.25% at the portfolio level.

With respect to the effects of LEV risk factor, the results for the SRI group are quite different from the Conventional and Islamic stocks, suggesting that stocks in this category are less sensitive to the economy-wide leverage risk factor. Certainly, leverage risk for this type of firms is not unusually different but perhaps the nature of the business these firms are involved may make it less susceptive to economy wide leverage risk. It may also be possible that during the financial crisis, while

socially responsible investing would have earned positive risk premium with respect the HML, SRI investors would have earned a negative risk premium when leverage was employed as a stock picking strategy. Whether SRI investing produces a lower return because these stocks are generally less sensitive to the economy wide risk factors suggests that these stocks may offer significant diversification benefits. Overall, further research along these lines would offer more clues as to why SRI stocks have negative risk premium for leverage risk.

d.8 Partial F-test

Table 12 reports partial F-statistics (across all the three groups - all stock portfolios), for the aggregate, non-crisis, and crisis periods in order to test for the significance of the contribution made by LEV. For the combined stock portfolios, the partial F statistic is significant in 24 out of 27 portfolios during the aggregate period. During the non-crisis period, the number of significant partial F statistics is reduced to 17 cases. However, the effect of LEV is prominent during the crisis period with significant partial F statistics in all 27 portfolios. For the Islamic stocks, the results are quite strong. The number of cases F-statistics is significant is 17 (aggregate period), 15 (non-crisis period), and 27 (crisis period). Finally, we find that the SRI stocks only portfolios are not sensitive to the leverage risk during the credit crisis.

Overall, the regression results suggest that while the sensitivities of the portfolio returns to the FF factors are significant during the aggregate and the non-crisis periods, there are important changes in the sign and significance of these factors during the crisis period. Their significance also weakens with the introduction of leverage as a risk factor, almost to the tune of being subsumed by the leverage risk factor. The effects of the market factor are persistent before the crisis period but surprisingly became insignificant during the crisis period. Leverage factor is consistently significant across all the periods and its effect is more prominent during the crisis period due to the greater debt exposure of the firms and higher macroeconomic risk. The results further support the conclusions drawn in the earlier tables.

d.9 Leverage Risk Factor for US Stocks

A potential shortcoming of the preceding results is due to the fact that our previous samples include stocks traded globally and may not accurately quantify the effects of the credit crisis on the US market. We therefore conduct another experiment using US stocks only. This additional exercise is carried out by

excluding all non-US stocks, creating traditional Fama-French factors, and adding our newly created LEV factor to represent financial distress. In addition, we also estimate GARCH regressions to demonstrate that our risk factors represent macroeconomic shocks as well. While the results are not presented to save space, we can summarize the results as follows. We find that for predicting US industrial production, the following variables are statistically significant: SMB, HML, XMKT, HML (t-2), and LEV (t-2). For predicting US unemployment rate, variables such as SMB, HML, LEV and several interaction variables on LEV (for 2008 credit crisis period) are significant at various lag length. We find that several interaction variables using LEV are significant in predicting the credit spread and term spread. Finally, dummy variables on LEV are highly significant in affecting changes in the US inflation rate. Overall, it is safe to conclude that the risk factors contain adequate information on the US economy.

Next, GARCH regressions are estimated. For the aggregate period (Jan2000 – April 2009), out of 27 portfolios, SMB has 18 (6) positive (negative) coefficients. HML has 16 (8) positive (negative) coefficients. In contrast, for Model 2 (where we add LEV), the results are as follows: SMB has 18 positive and 4 negative coefficients, HML has 17 positive and 9 negative coefficients, and LEV has 6 positive and 17 negative coefficients. For the non-crisis period (January 2000 – June 2007), SMB has 18 (7) positive (negative) coefficients. HML has 13 (10) positive (negative) coefficients. In contrast, for Model 2, SMB has 18 positive and 7 negative coefficients, HML has 14 positive and 9 negative coefficients, and LEV has 6 positive and 18 negative coefficients. In all cases, there is a significant increase in $R^2$when we add LEV in the model.

For the crisis period (July 2007- April 2009), SMB has 20 positive coefficients. HML has 17 (8) positive (negative) coefficients. For Model 2, SMB has 19 positive and 1 negative coefficients, HML has 17 positive and 8 negative coefficients, and LEV has 9 positive and 5 negative coefficients. As noted earlier, there is a marked improvement in the regression R^2 when LEV is added.

Finally, we estimated the partial F-statistics to measure the marginal significance of LEV in the model. Similar to the results for global stocks, we find that LEV contributes to improving the overall significance of the model. In all three periods (aggregate, non-crisis and turbulent), the partial F-statistics is significant in majority of the cases.

5. Conclusions

Fama and French (1993) note that the traditional FF factors SMB and HML are good proxies for the underlying distress risk of the firms. As of today, a comparison of how well SMB and HML explain stock returns across good times and bad is missing from the literature. In particular, an investigation into whether the economy wide leverage factor replicates the underlying economic fundamentals and contributes to systematic risk especially during bad times is still abstruse; and we attempt to unravel this puzzle in the present study. Our hypothesis is that, compared to conventional stocks with high leverage, we would expect SC stocks to have lower sensitivity to risk factors, as well as lower risk premium. This finding would significantly reaffirm the notion that excessive leverage and engaging in economic activities that are not consistent with the principles of Islamic transactions can destroy economic and social values, especially during falling market environment.

Using weekly data on stock returns for 3704 firms, we test for the significance of the factors constructed on the basis of size, book to market equity, and leverage. We find that the significance of the market factor is drastically reduced during the recent crisis while the explanatory power of the Fama-French factors, SMB and HML is reduced considerably. In contrast, leverage risk factor performs considerably well across all there periods, especially well during the financial crisis, in capturing systemic risk in the economy. Its addition to the model is directly correlated with the reduction of the economic and statistical significance of the traditional Fama-French factors.

The main result of this paper is that the effects of leverage risk are robust to heterogeneity of the firms in the sample. To show that, we perform cross-sectional regressions across three distinct categories of stocks i.e. Conventional, Islamic, and SRI stocks. First, as indicated in the earlier section, excess market returns play a leading role in explaining the cross section of expected returns prior to the crisis period, but the effects of the market factor consistently phased out across all the three categories of stocks during the crisis period. The effects of the leverage factor are consistently significant (except in the case of the socially responsible investing stocks) throughout; however leverage factor gains momentum during the crisis period and has a significant effect on the cross-section of expected returns on stocks and portfolios. The sensitivities of stock returns to the Fama-French factors are lower after the introduction of the leverage factor.

In a nutshell, the contribution of leverage risk to asset pricing has been quite strong. The results indicate that leverage based risk factor can explain a substantial portion of the cross-section of stock returns across financial and non-financial stocks, as well as, various categories of stocks including conventional, Islamic, and SRI stocks. These results have powerful implications for asset management using various types of stocks and also during periods of great uncertainties.

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Table-1
Number of stocks

Year	No. Of stocks
2000	3745
2001	4344
2002	4378
2003	4379
2004	4396
2005	4403
2006	4399
2007	4399
2008	4406
2009	4391

Table-2A
Correlation matrix of the explanatory factors for – all stocks
(Jan 2000 – April 2009)

	XMKT	SMB	LEV	HML
XMKT	1.000	-0.087	0.031	-0.057
SMB	-0.087	1.000	-0.030	0.086
LEV	0.031	-0.030	1.000	0.451
HML	-0.057	0.086	0.451	1.000

Table-2B
Correlation matrix of the explanatory factors – all stocks
(Jan 2000 – June 2007)

	XMKT	SMB	LEV	HML
XMKT	1.000	-0.151	-0.145	-0.213
SMB	-0.151	1.000	0.205	0.283
LEV	-0.145	0.205	1.000	0.407
HML	-0.213	0.283	0.407	1.000

Table-2C
Correlation matrix of the explanatory factors – all stocks
(July 2007 – April 2009)

	XMKT	SMB	LEV	HML
XMKT	1.000	-0.007	0.222	0.143
SMB	-0.007	1.000	-0.448	-0.301
LEV	0.222	-0.448	1.000	0.523
HML	0.143	-0.301	0.523	1.000

Table-3
Descriptive statistics of the returns on Market factor, SMB, HML, and LEV factors

	XMKT	SMB	LEV	HML
Mean	-0.002	0.002	0.000	0.001
Median	0.001	0.002	0.000	0.001
Maximum	0.115	0.054	0.045	0.053
Minimum	-0.221	-0.063	-0.035	-0.049
Std. Dev.	0.027	0.017	0.008	0.013
Skewness	-1.398	-0.272	-0.077	0.127
Kurtosis	13.623	4.883	6.630	6.155

XMKT is defined as r_m-$r_f$wherer_f is the return on the risk free asset and r_m is the return on the market portfolio. SMB is the return on the size mimicking portfolio constructed by taking the simple average of the returns each week of all "small" portfolios minus "big" portfolios. HML is the return on book to market mimicking portfolio constructed by taking the simple average of the returns each week of all "high BE/ME" portfolios minus "low BE/ME" portfolios. LEV is the return on leverage mimicking portfolios constructed by taking the simple average of the returns each week of all "high leverage" portfolios minus "low leverage portfolios".

Table-4
Multivariate regressions of macroeconomic variables conditional on factor returns during the aggregate period

The following regression is estimated to demonstrate the link between Fama-French factors and economic variables:

$$Y_{kt} = \beta_0 + \beta_1 (r_m - r_{ft})_{t-i} + \beta_2 R_{t-i,SMB} + \beta_3 R_{t-i,HML} + \beta_4 R_{t-i,LEV} + \varepsilon_t$$

where Y_{kt}represents each of these macroeconomic variables (monthly Industrial production growth rates, monthly unemployment rate, monthly data for percentage change in inflation rates and weekly data for credit spread and term spread) for the combined period (January 2000 to April 2009). *i* represents the number of lagged terms 1 to 3. r_f is the return on the risk free asset and r_m is the return on the market portfolio. r_f is the return on the risk free asset and r_m is the return on the market portfolio. $R_{\mathrm{SMB}}$is the return on the size mimicking portfolio constructed by taking the simple average of the returns each week of all "small" portfolios minus "big" portfolios. R_{HML} is the return on book to market mimicking portfolio constructed by taking the simple average of the returns each week of all "high BE/ME" portfolios minus "low BE/ME" portfolios. $R_{\mathrm{LEV}}$is the return on leverage mimicking portfolios constructed by taking the simple average of the returns each week of all "high leverage" portfolios minus "low leverage portfolios".

Panel A

	Industrial Production		Unemployment rate		Credit Spread		Term Spread		%change in inflation rate	
	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats
$XMKT_{t-1}$	-3.241	-0.307	0.007	0.044	-0.0001	-2.081**	0.0000	-1.660*	1.847	-0.172
SMB_{t-1}	-41.724	-2.249**	0.338	1.110	0.0001	1.326	-0.0001	-2.965**	1.532	1.365
HML_{t-1}	-29.364	-1.090	0.729	1.721*	0.0001	0.681	-0.0001	-1.393	-6.337	0.959
LEV_{t-1}	62.315	1.540	-1.667	-2.302**	-0.0003	-1.404	0.0001	1.348	5.998	-2.207**
R-square	0.105		0.114**		0.030**		0.028**		0.152**	

Panel B

	Industrial Production		Unemployment rate		Credit Spread		Term Spread		%change in inflation rate	
	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats
$XMKT_{t-1}$	-2.582	-0.205	0.016	0.098	-0.0001	-1.619	0.0000	-1.501	2.308	1.707
	Industrial Production		Unemployment rate		Credit Spread		Term Spread		%change in inflation rate	

SMB_{t-1}	-47.422	-3.096**	0.438	1.786*	0.0001	1.928**	-0.0001	-2.992**	1.172	0.792
HML_{t-1}	-20.096	-0.794	0.578	1.588	0.0001	0.507	-0.0001	-1.802*	-5.263	-1.897*
LEV_{t-1}	24.896	0.903	-0.910	-1.840*	-0.0002	-0.960	0.0001	1.362	3.367	0.814
$XMKT_{t-2}$	13.845	2.104**	-0.350	-2.413**	-0.0001	-3.493**	0.0000	-0.388	0.361	0.454
SMB_{t-2}	-23.054	-1.497	0.087	0.305	0.0001	0.835	0.0000	-0.519	0.187	0.123
HML_{t-2}	-21.410	-0.897	0.447	1.018	0.0000	-0.183	-0.0002	-2.547**	0.306	0.165
LEV_{t-2}	61.648	1.553	-1.043	-1.412	-0.0001	-0.687	0.0001	0.951	5.379	2.274**
R-square	0.224		0.219		0.054		0.042		0.186	

Panel C

	Industrial Production		Unemployment rate		Credit Spread		Term Spread		%change in inflation rate	
	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats	Coeff.	t-stats
$XMKT_{t-1}$	-5.246	-0.410	0.090	0.535	-0.0001	-1.651*	0.0000	-1.402	2.403	1.678*
SMB_{t-1}	-48.352	-3.397	0.480	2.004**	0.0001	1.835*	-0.0001	-2.961	0.803	0.537
HML_{t-1}	-7.562	-0.297	0.230	0.579	0.0001	0.540	-0.0001	-1.733	-4.378	-1.353
LEV_{t-1}	44.872	1.699	-1.224	-2.597**	-0.0002	-1.038	0.0001	1.267	3.673	0.859
$XMKT_{t-2}$	18.343	2.842	-0.458	-3.220**	-0.0001	-4.013**	0.0000	-0.505	0.739	0.991
SMB_{t-2}	-25.884	-2.343	0.196	0.941	0.0000	0.603	0.0000	-0.585	0.067	0.049
HML_{t-2}	-6.985	-0.384	0.270	0.946	0.0000	-0.320	-0.0001	-2.321	0.110	0.053
LEV_{t-2}	1.522	0.045	-0.043	-0.084	-0.0001	-0.787	0.0001	0.812	6.470	2.284**
$XMKT_{t-3}$	16.418	2.282	-0.476	-3.596**	0.0000	-0.529	0.0000	0.473	0.308	0.338
SMB_{t-3}	-25.738	-1.619	0.087	0.316	0.0000	0.354	0.0000	0.225	0.393	0.214
HML_{t-3}	2.303	0.149	-0.631	-2.107**	-0.0001	-0.923	0.0000	0.738	5.296	2.655**
LEV_{t-3}		2.740**	-1.109	-2.042**	0.0003	1.953*	0.0000	0.153	-2.493	-0.861
R-square	0.430		0.412		0.066		0.044		0.215	

(* indicates significant at 10% level, ** indicates significance at 5% level)

Table-5

Summary of results showing the number of stocks and portfolios which showed significant sensitivities to XMKT, SMB, HML, and LEV factors.

Model 1

$$r_{it} - r_{ft} = \beta_0 + \beta_1(r_{mt} - r_{ft}) + \beta_2 R_{t,SMB} + \beta_3 R_{t,HML} + \varepsilon_t$$

$$\varepsilon_t \mid \psi_{t-1} \sim N(0, \sigma_t^2),$$

$$\sigma_t^2 = \Omega + \sum_{i=1}^{q} \alpha_i \varepsilon^2{}_{t-i} + \sum_{j=1}^{p} \delta_i \sigma_{t-j}$$

Model 2

$$r_{it} - r_{ft} = \beta_0 + \beta_1(r_{mt} - r_{ft}) + \beta_2 R_{t,SMB} + \beta_3 R_{t,HML} + \beta_4 R_{t,LEV} + \varepsilon_t$$

$$\varepsilon_t \mid \psi_{t-1} \sim N(0, \sigma_t^2),$$

$$\sigma_t^2 = \Omega + \sum_{i=1}^{q} \alpha_i \varepsilon^2{}_{t-i} + \sum_{j=1}^{p} \delta_i \sigma_{t-j}$$

where, r_i is the return on portfolio i; r_f is the return on the risk free asset and r_m is the return on the market portfolio. $R_{\mathrm{SMB}}$is the return on the size mimicking portfolio constructed by taking the simple average of the returns each week of all "small" portfolios minus "big" portfolios. R_{HML} is the return on book to market mimicking portfolio constructed by taking the simple average of the returns each week of all "high BE/ME" portfolios minus "low BE/ME" portfolios. $R_{\mathrm{LEV}}$is the return on leverage mimicking portfolios constructed by taking the simple average of the returns each week of all "high leverage" portfolios minus "low leverage portfolios". All indicated coefficients with (*) are significant at least at the 5% level of significance.[32]

[32] Model 1 and Model 2 remain the same for the rest of the tables. Hence the equations are not presented henceforth and the models will just be referred to as Model 1 and Model 2.

Table-5 *(continued)*

		All stocks: 3707						All Portfolios: 27			
Panel A: Aggregate Period						**Panel D: Aggregate Period**					
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	3304	1208	1539		Model 1	Positive	27	13	18	
	Negative	0	1114	216			Negative	0	9	3	
	Total	3304	2322	1755			Total	27	22	21	
Model 2	Positive	3312	1234	1005	2208	Model 2	Positive	27	12	17	19
	Negative	0	1147	459	125		Negative	0	9	6	1
	Total	3312	2381	1464	2333		Total	27	21	23	20
%change in significance (by model)		0.24%	2.54%	-16.58%		%change in significance (by model)		0.00%	-4.55%	9.52%	
Panel B: Non-crisis Period						**Panel E: Non-crisis Period**					
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	3570	1461	1244	0	Model 1	Positive	27	15	18	
	Negative	0	612	417			Negative	0	9	3	
	Total	3570	2073	1661			Total	27	24	21	
Model 2	Positive	3584	1431	1088	882	Model 2	Positive	27	15	18	17
	Negative	0	680	539	149		Negative	0	9	5	3
	Total	3584	2111	1627	1031		Total	27	24	23	20
%change in significance (by model)		0.39%	1.83%	-2.05%		%change in significance (by model)		0.00%	0.00%	9.52%	
Panel C: Crisis period						**Panel F: Crisis period**					
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	439	401	1330	0	Model 1	Positive	4	0	16	
	Negative	115	1564	96			Negative	0	17	0	
	Total	554	1965	1426			Total	4	17	16	
Model 2	Positive	157	854	439	3038	Model 2	Positive	0	7	1	27
	Negative	384	941	740	66		Negative	0	7	12	0
	Total	541	1795	1179	3104		Total	0	14	13	27
%change in significance (by model)		-2.35%	-8.65%	-17.32%		%change in significance (by model)		0.00%	-17.65%	-18.75%	
%change in significance (by period)		-84.91%	-14.97%	-27.54%	201.07%	**%change in significance (by period)**		-100.00%	-41.67%	-43.48%	35.00%

Table-6
Factor loadings of all firms for the aggregate period (January 2000 to April 2009)

Aggregate Period											
	Model 1					Model 2					
Portfolio	Intercept	MKT	SMB	HML	Adj. R-square	Intercept	MKT	SMB	HML	LEV	Adj. R-square
1	0.002*	0.794*	0.388*	-0.235*	-0.015	0.002*	0.794*	0.389*	-0.231*	-0.023	-0.021
2	0.002*	0.663*	0.344*	-0.047	0.000	0.002*	0.642*	0.301*	-0.193*	0.722*	0.103
3	0.001	0.742*	0.598*	0.053	-0.004	0.001	0.727*	0.560*	-0.254*	1.303*	0.169
4	0.002	0.557*	0.390*	0.261*	0.014	0.001	0.547*	0.364*	0.248*	0.145	0.042
5	0.000	0.661*	0.546*	0.431*	-0.001	0.000	0.665*	0.521*	0.353*	0.396*	0.064
6	0.000	0.723*	0.565*	0.565*	0.024	0.000	0.701*	0.510*	0.444*	0.457*	0.103
7	0.000	0.622*	0.640*	0.744*	0.055	-0.001	0.639*	0.671*	0.753*	-0.118	0.021
8	0.000	0.765*	0.731*	0.812*	0.022	0.000	0.767*	0.720*	0.740*	0.306*	0.059
9	0.000	0.840*	0.842*	0.923*	0.080	0.000	0.862*	0.890*	0.725*	0.741*	0.141
10	0.000	0.896*	0.053	-0.264*	-0.041	0.000	0.900*	0.044	-0.289*	0.141	-0.028
11	0.001	0.690*	0.062	-0.072	0.009	0.001	0.700*	0.023	-0.169*	0.453*	0.079
12	0.000	0.718*	0.009	0.016	-0.021	0.000	0.733*	-0.050	-0.155	0.807*	0.101
13	0.000	0.630*	0.083	0.372*	-0.014	0.000	0.628*	0.050	0.306*	0.337*	0.034
14	0.001	0.631*	0.052	0.340*	0.042	0.001	0.648*	-0.003	0.214*	0.548*	0.129
15	0.001	0.632*	0.138*	0.462*	0.032	0.001	0.634*	0.089	0.306*	0.659*	0.151
16	0.000	0.630*	0.226*	0.892*	0.108	0.000	0.628*	0.222*	0.874*	0.053	0.112
17	0.001	0.749*	0.250*	0.684*	0.051	0.001	0.752*	0.203*	0.590*	0.515*	0.132
18	0.001	0.810*	0.188*	0.872*	0.086	0.001	0.814*	0.130*	0.716*	0.939*	0.215

	Aggregate Period										
	Model 1					Model 2					
Portfolio	Intercept	MKT	SMB	HML	Adj. R-square	Intercept	MKT	SMB	HML	LEV	Adj. R-square
19	0.000	0.772*	-0.470*	-0.288*	0.198	0.000	0.775*	-0.467*	-0.274*	-0.100	0.189
20	0.000	0.656*	-0.396*	0.035	0.094	0.000	0.651*	-0.406*	-0.022*	0.409*	0.148
21	0.000	0.613*	-0.379*	0.082	0.122	0.000	0.622*	-0.358*	-0.075	0.650*	0.202
22	0.001	0.698*	-0.387*	0.255*	0.064	0.001	0.671*	-0.414*	0.180*	0.312	0.104
23	0.001	0.721*	-0.283*	0.352*	0.073	0.001	0.718*	-0.338*	0.261*	0.599*	0.158
24	0.001	0.671*	-0.253*	0.505*	0.103	0.001	0.667*	-0.262*	0.357*	0.543*	0.184
25	0.002*	0.804*	-0.839*	0.856*	0.297	0.002*	0.806*	-0.848*	0.937*	-0.430*	0.277
26	0.000	0.773*	-0.321*	0.901*	0.179	0.000	0.769*	-0.290*	0.670*	1.035*	0.255
27	0.002*	0.846*	-0.486*	0.880*	0.255	0.002*	0.857*	-0.562	0.688*	1.271*	0.401

Table-7
Factor loadings of all firms for non-crisis period (January 2000 to June 2007)

Non-crisis Period											
	Model 1					Model 2					
Portfolio	Intercept	XMKT	SMB	HML	Adj. R-square	Intercept	XMKT	SMB	HML	LEV	Adj. R-square
1	0.002*	0.856	0.449*	-0.259*	0.473	0.002*	0.851*	0.454*	-0.224*	-0.195	0.473
2	0.002*	0.778	0.457*	-0.139	0.320	0.002*	0.783*	0.447*	-0.204*	0.343	0.328
3	0.001	0.822	0.678*	0.005	0.378	0.001	0.846*	0.646*	-0.253*	1.119*	0.419
4	0.001	0.673	0.397*	0.278*	0.394	0.001	0.674*	0.396*	0.277*	0.005	0.392
5	0.000	0.709	0.565*	0.435*	0.440	0.000	0.722*	0.540*	0.378*	0.313*	0.449
6	0.000	0.781	0.618*	0.562*	0.433	0.000	0.777*	0.572*	0.479*	0.311*	0.450
7	-0.001	0.785	0.686*	0.712*	0.532	-0.001	0.777*	0.699*	0.772*	-0.221*	0.531
8	0.000	0.807	0.764*	0.817*	0.501	0.000	0.810*	0.760*	0.766*	0.212*	0.502
9	0.000	0.878	0.882*	0.925*	0.471	0.000	0.899*	0.916*	0.775*	0.637	0.475
10	-0.001	0.973	0.142*	-0.367*	0.466	-0.001	0.974*	0.142*	-0.369*	0.008	0.464
11	0.000	0.743	0.069	-0.073	0.446	0.000	0.764*	0.045	-0.143	0.322*	0.456
12	0.000	0.791	0.081	-0.070	0.324	0.000	0.812*	0.027	-0.178	0.661*	0.361
13	0.000	0.699	0.127*	0.346*	0.383	0.000	0.703*	0.106*	0.310*	0.213*	0.386
14	0.001	0.687	0.077	0.346*	0.405	0.001	0.715*	0.049	0.256*	0.429*	0.422
15	0.001	0.662	0.176*	0.436*	0.400	0.001	0.682*	0.119*	0.338*	0.559*	0.437
16	0.000	0.701	0.294*	0.846*	0.482	0.000	0.700*	0.300*	0.870*	-0.084	0.481
17	0.001	0.781	0.298*	0.668*	0.469	0.001	0.797*	0.271*	0.599*	0.392*	0.484
18	0.001	0.852	0.233*	0.834*	0.446	0.001	0.886*	0.171*	0.729*	0.832*	0.473
19	0.000	0.865	-0.360*	-0.354*	0.542	0.000	0.929*	-0.349*	-0.415*	-0.430*	0.552
20	0.000	0.693	-0.367*	0.040	0.502	0.000	0.694*	-0.374*	-0.003	0.314*	0.511

Non-crisis Period											
	Model 1					Model 2					
Portfolio	Intercept	XMKT	SMB	HML	Adj. R-square	Intercept	XMKT	SMB	HML	LEV	Adj. R-square
21	0.000	0.664	-0.308*	0.037	0.437	0.000	0.682*	-0.304*	-0.085	0.539*	0.461
22	0.001	0.823	-0.335*	0.255*	0.420	0.001	0.814*	-0.345*	0.221*	0.170	0.422
23	0.001	0.769	-0.226*	0.324*	0.478	0.001	0.779*	-0.280*	0.266*	0.523*	0.504
24	0.001	0.715	-0.205*	0.498*	0.453	0.001	0.721*	-0.215*	0.392*	0.447*	0.480
25	0.002*	0.883	-0.747*	0.812*	0.401	0.002*	0.867*	-0.753	0.930*	-0.699*	0.441
26	0.000	0.951	-0.496*	0.940*	0.363	0.000	1.014*	-0.478	0.707*	0.666*	0.363
27	0.002*	0.891	-0.416*	0.846*	0.395	0.002*	0.921*	-0.450	0.677*	0.992*	0.456

Table-8
Factor loadings of all firms during crisis period (July 2007 to April 2009)

	Crisis period										
	Model 1					Model 2					
Portfolio	Intercept	XMKT	SMB	HML	Adj. R-square	Intercept	XMKT	SMB	HML	LEV	Adj. R-square
1	-0.003	0.075	-0.320	0.161	-0.034	-0.001	-0.034	0.264	-0.942*	2.931*	0.410
2	-0.005	0.084	-0.164	0.221	-0.040	-0.002	0.020	0.461*	-0.974*	3.193*	0.444
3	-0.003	0.077	-0.326	0.498	-0.005	0.000	-0.028	0.393*	-0.831*	3.633*	0.549
4	-0.003	0.087	-0.079	0.608*	-0.010	-0.003	0.038	0.238	-0.180	1.784*	0.312
5	-0.003	0.145	-0.151	0.711*	0.012	-0.003	0.029	0.385*	-0.364	2.610*	0.450
6	-0.004	0.167*	0.060	0.757*	0.004	-0.004	0.064	0.598*	-0.196	2.643*	0.427
7	-0.004	0.078	0.129	0.782*	0.053	-0.003	-0.033	0.436*	0.177	1.563*	0.311
8	-0.002	0.196*	-0.081	0.855*	0.053	-0.001	0.019	0.544*	-0.087	2.736*	0.473
9	-0.002	0.112	0.077	1.347*	0.136	0.000	0.018	0.748*	-0.080	3.851*	0.587
10	-0.003	0.086	-0.520*	0.361	0.026	-0.001	0.063	0.022	-0.927*	3.042*	0.458
11	-0.004	0.037	-0.619*	0.522	0.053	-0.003	-0.007	-0.128	-0.910*	3.149*	0.506
12	-0.004	0.109	-0.791*	0.463	0.105	-0.003	0.063	-0.247	-0.859*	3.078*	0.538
13	-0.003	0.100	-0.370*	0.702*	0.059	-0.003	0.057	0.031	-0.274	2.140*	0.385
14	-0.003	0.127	-0.728*	0.724*	0.132	-0.002	0.039	-0.119	-0.442*	3.061*	0.552
15	-0.004	0.095	-0.586*	0.908*	0.130	-0.003	0.034	-0.016	-0.490*	3.328*	0.561
16	-0.003	0.098	-0.275	0.871*	0.134	-0.003	0.028	0.114	0.096	1.895*	0.373
17	-0.003	0.031	-0.556*	1.278*	0.175	-0.002	0.012	0.020	0.039	3.287*	0.609
18	-0.005	0.051	-0.863*	1.541*	0.264	-0.003	0.045	-0.134	-0.112	4.033*	0.657
19	-0.002	0.173*	-1.069*	-0.026	0.182	-0.002	0.028	-0.554*	-0.877*	2.388*	0.522
20	-0.001	0.119	-0.964*	-0.011	0.113	-0.002	0.000	-0.349	-1.069*	2.744*	0.479

Crisis period											
	Model 1					Model 2					
Portfolio	Intercept	XMKT	SMB	HML	Adj. R-square	Intercept	XMKT	SMB	HML	LEV	Adj. R-square
21	-0.003	0.194*	-1.017*	0.092	0.117	-0.002	0.044	-0.475*	-0.853*	2.596*	0.531
22	-0.002	0.146	-0.903*	0.278	0.089	-0.001	-0.042	-0.480*	-0.416	2.083*	0.356
23	-0.002	0.160	-1.064*	0.445	0.178	-0.002	0.009	-0.485*	-0.600*	2.883*	0.534
24	-0.004	0.157	-0.897*	0.749*	0.199	-0.003	0.024	-0.386	-0.413	2.875*	0.561
25	-0.004	0.196	-1.176*	0.887*	0.374	-0.002	0.129	-0.735*	-0.004	2.702*	0.581
26	-0.004	0.043	-1.124*	1.435*	0.386	-0.003	0.048	-0.587*	0.333	2.972*	0.680
27	-0.005	-0.008	-1.782*	1.765*	0.454	-0.002	-0.048	-1.153*	0.486*	3.693*	0.771

Table-9
Summary of factor loadings for financial and non financial stock portfolios

		Financial stock portfolios						Non financial stock portfolios			
		Pane A: Aggregate Period						**Panel D: Aggregate Period**			
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	27	7	15		Model 1	Positive	27	13	18	
	Negative	0	15	7			Negative	0	8	3	
	Total	27	22	22			Total	27	21	21	
Model 2	Positive	27	7	15	17	Model 2	Positive	27	13	18	16
	Negative	0	16	7	0		Negative	0	9	6	1
	Total	27	23	22	17		Total	27	22	24	17
%change in significance (by model)		0.00%	4.55%	0.00%		%change in significance (by model)		0.00%	4.76%	14.29%	
		Panel B: Non-crisis Period						**Panel E: Non-crisis Period**			
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	27	8	15	0	Model 1	Positive	27	14	18	
	Negative	0	12	7			Negative	0	9	3	
	Total	27	20	22			Total	27	23	21	
Model 2	Positive	27	8	15	14	Model 2	Positive	27	14	18	14
	Negative	0	11	7	4		Negative	0	9	3	4
	Total	27	19	22	18		Total	27	23	21	18
%change in significance (by model)		0.00%	-5.00%	0.00%		%change in significance (by model)		0.00%	0.00%	0.00%	
		Panel C: Crisis period						**Panel F: Crisis period**			
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	15	0	3	0	Model 1	Positive	0	0	6	
	Negative	0	25	4			Negative	0	6	4	

		Financial stock portfolios						**Non financial stock portfolios**			
	Total	15	25	7			Total	0	6	10	
Model 2	Positive	4	0	6	23	Model 2	Positive	0	10	0	27
	Negative	0	18	3	0		Negative	0	4	9	0
	Total	4	18	9	23		Total	0	14	9	27
%change in significance (by model)		-73.33%	-28.00%	28.57%		%change in significance (by model)		0.00%	133.33%	-10.00%	
%change in significance (by period)		-85.19%	-5.26%	-59.09%	27.78%	**%change in significance (by period)**		-100.00%	-39.13%	-57.14%	50.00%

Table-10
Partial f-statistics testing for the significance of contribution made by the LEV factor for all stock, financial and non financial portfolios

Restricted Model

$$r_{it} - r_{ft} = \beta_0 + \beta_1(r_{mt} - r_{ft}) + \beta_2 R_{t,SMB} + \beta_3 R_{t,HML} + \varepsilon_t$$

$$\varepsilon_t \mid \psi_{t-1} \sim N(0, \sigma_t^2),$$

$$\sigma_t^2 = \Omega + \sum_{i=1}^{q} \alpha_i \varepsilon^2{}_{t-i} + \sum_{j=1}^{p} \delta_i \sigma_{t-j}$$

Unrestricted Model

$$r_{it} - r_{ft} = \beta_0 + \beta_1(r_{mt} - r_{ft}) + \beta_2 R_{t,SMB} + \beta_3 R_{t,HML} + \beta_4 R_{t,LEV} + \varepsilon_t$$

$$\varepsilon_t \mid \psi_{t-1} \sim N(0, \sigma_t^2),$$

$$\sigma_t^2 = \Omega + \sum_{i=1}^{q} \alpha_i \varepsilon^2{}_{t-i} + \sum_{j=1}^{p} \delta_i \sigma_{t-j}$$

where, r_i is the return on portfolio i; r_f is the return on the risk free asset and r_m is the return on the market portfolio. $R_{SMB}$is the return on the size mimicking portfolio constructed by taking the simple average of the returns each week of all "small" portfolios minus "big" portfolios. R_{HML} is the return on book to market mimicking portfolio constructed by taking the simple average of the returns each week of all "high BE/ME" portfolios minus "low BE/ME" portfolios. $R_{LEV}$is the return on leverage mimicking portfolios constructed by taking the simple average of the returns each week of all "high leverage" portfolios minus "low leverage portfolios". Partial f-statistics and the p-values test for the significance in the contribution of R-square made by the new model (which includes the LEV factor). The factors SMB, HML and LEV have been rebalanced for financial stock portfolios and non financial stock portfolios. (*) indicates significance at 5% level of significance. GARCH models are estimated using the Bollerslev-Wooldridge corrections to the standard errors. Model 1 excludes LEV. Model 2 includes LEV. Coefficients of the GARCH variance equations are not reported to conserve space. They are available upon request.

	All stock portfolios			Financial stock portfolios			Non-financial stock portfolios		
Portfolio	*Aggregate Period* Partial f-statistic	*Non-crisis Period* Partial f-statistic	*Crisis Period* Partial f-statistic	*Aggregate Period* Partial f-statistic	*Non-crisis Period* Partial f-statistic	*Crisis Period* Partial f-statistic	*Aggregate Period* Partial f-statistic	*Non-crisis Period* Partial f-statistic	*Crisis Period* Partial f-statistic
1	-1.62	1.04	71.90*	-0.17	2.04	9.64*	-8.36	10.65*	75.57*
2	56.73*	5.39*	82.82*	115.83*	6.41*	33.22*	45.46*	7.58*	90.27*
3	101.36*	28.68*	116.58*	214.21*	30.94*	83.68*	72.96*	16.11*	127.92*

	All stock portfolios			Financial stock portfolios			Non-financial stock portfolios		
Portfolio	*Aggregate Period* Partial f-statistic	*Non-crisis Period* Partial f-statistic	*Crisis Period* Partial f-statistic	*Aggregate Period* Partial f-statistic	*Non-crisis Period* Partial f-statistic	*Crisis Period* Partial f-statistic	*Aggregate Period* Partial f-statistic	*Non-crisis Period* Partial f-statistic	*Crisis Period* Partial f-statistic
4	14.96*	-0.01	45.12*	11.11*	-0.07	4.60*	1.26	1.73	49.54*
5	34.46*	7.13*	75.91*	94.36*	2.16	49.55*	12.75*	0.13	81.80*
6	43.57*	13.12*	70.42*	101.84*	11.67*	44.31*	9.16*	-0.18	73.26*
7	-15.57	0.34	36.19*	-13.06	-3.84	3.66	-6.98	2.99	39.88*
8	19.58*	2.22	75.98*	95.79*	5.93*	14.53*	5.07*	-0.88	84.74*
9	35.62*	4.19*	103.75*	178.07*	24.36*	52.41*	15.69*	-0.56	137.36*
10	6.96*	-0.11	76.02*	19.93*	0.39	16.06*	-1.71	12.03*	78.90*
11	37.50*	8.58*	87.33*	78.43*	4.73*	21.61*	12.12*	0.92	99.36*
12	66.64*	23.42*	89.13*	189.67*	24.14*	62.10*	31.73*	5.81*	104.67*
13	25.01*	2.55	50.96*	4.82*	2.34	6.09*	5.04*	-1.87	58.03*
14	49.24*	12.04*	89.40*	80.92*	-38.57	21.53*	28.36*	6.12*	97.85*
15	68.41*	26.13*	93.21*	126.42*	17.04*	53.15*	37.70*	10.87*	109.78*
16	3.29	0.71	36.76*	-6.22	22.03*	5.42*	5.44*	-0.52	55.13*
17	46.24*	12.02*	105.33*	108.33*	9.49*	24.76*	33.00*	6.07*	112.73*
18	80.45*	21.10*	108.63*	217.60*	23.24*	53.18*	61.30*	11.21*	148.07*
19	-4.56*	9.18*	68.14*	18.88*	-0.99	16.25*	-3.45	15.24*	79.61*
20	31.43*	8.18*	67.16*	41.14*	0.03	25.47*	24.38*	9.57*	79.64*
21	49.63*	18.60*	83.87*	75.18*	13.06*	39.69*	50.31*	3.95*	91.88*
22	22.87*	2.70	39.97*	12.65*	-0.83	13.91*	1.05	1.35	39.27*
23	49.86*	21.54*	72.94*	75.48*	2.52	40.51*	34.80*	8.93*	84.35*
24	48.31*	21.56*	78.73*	162.88*	15.23*	52.25*	37.14*	13.95*	86.59*
25	-12.15*	28.19*	47.55*	2.89*	9.85*	7.90*	0.62	43.70*	42.22*
26	50.41*	1.07	87.66*	72.14*	-0.97	31.74*	49.04*	1.20	88.80*
27	118.71*	44.78*	131.34*	355.94*	116.64*	58.15*	74.25*	25.09*	153.14*

Table-11
Factor loadings by types of firms

PANEL A

Conventional stocks: 2308						Conventional portfolios: 27					
Aggregate Period						Aggregate Period					
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	1757	8	1023		Model 1	Positive	27	4	18	
	Negative	0	1439	225			Negative	0	17	0	
	Total	1757	1447	1248			Total	27	21	18	
Model 2	Positive	1697	8	797	1208	Model 2	Positive	27	2	12	20
	Negative	0	1582	482	84		Negative	0	18	3	0
	Total	1697	1590	1279	1292		Total	27	20	15	20
%change in significance (by model)		-3.41%	9.88%	2.48%		%change in significance (by model)		0.00%	-4.76%	-16.67%	
Non-crisis Period						Non-crisis Period					
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	2076	7	917	0	Model 1	Positive	27	7	17	
	Negative	0	1108	378			Negative	0	14	0	
	Total	2076	1115	1295			Total	27	21	17	
Model 2	Positive	2056	6	863	459	Model 2	Positive	27	7	15	15
	Negative	0	1152	499	80		Negative	0	16	3	2
	Total	2056	1158	1362	539		Total	27	23	18	17
%change in significance (by model)		-0.96%	3.86%	5.17%		%change in significance (by model)		0.00%	9.52%	5.88%	
Crisis period						Crisis period					
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	290	262	1026	0	Model 1	Positive	10	0	27	
	Negative	76	996	12			Negative	0	16	0	

	Total	366	1258	1038			Total	10	16	27	
Model 2	Positive	92	525	480	1744	Model 2	Positive	0	5	9	27
	Negative	328	736	115	41		Negative	0	14	1	0
	Total	420	1261	595	1785		Total	0	19	10	27
%change in significance (by model)		14.75%	0.24%	-42.68%		%change in significance (by model)		0.00%	18.75%	-62.96%	
%change in significance (by period)		-79.57%	8.89%	-56.31%	231.17%	**%change in significance (by period)**		-100.00%	-17.39%	-44.44%	58.82%

PANEL B

		Islamic stocks: 1161						Islamic portfolios: 1161			
		Aggregate Period						Aggregate Period			
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	1004	402	252		Model 1	Positive	27	12	12	
	Negative	0	214	196			Negative	0	5	8	
	Total	1004	616	448			Total	27	17	20	
Model 2	Positive	1019	401	248	388	Model 2	Positive	27	12	12	10
	Negative	0	244	239	202		Negative	0	7	9	4
	Total	1019	645	487	590		Total	27	19	21	14
%change in significance (by model)		1.49%	4.71%	8.71%		%change in significance (by model)		0.00%	11.76%	5.00%	
		Non-crisis Period						Non-crisis Period			
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	1087	236	259		Model 1	Positive	27	10	13	
	Negative	0	276	234			Negative	0	7	8	
	Total	1087	512	493			Total	27	17	21	
Model 2	Positive	1089	254	265	178	Model 2	Positive	27	11	12	4
	Negative	0	254	263	280		Negative	0	7	8	11
	Total	1089	508	528	458		Total	27	18	20	15
%change in significance (by model)		0.18%	-0.78%	7.10%		%change in significance (by model)		0.00%	5.88%	-4.76%	

		Crisis period						Crisis period			
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	83	508	191		Model 1	Positive	0	0	7	
	Negative	33	48	64			Negative	0	11	3	
	Total	116	556	255			Total	0	11	10	
Model 2	Positive	92	489	133	873	Model 2	Positive	2	10	6	26
	Negative	43	69	97	38		Negative	0	0	2	0
	Total	135	558	230	911		Total	2	10	8	26
%change in significance (by model)		16.38%	0.36%	-9.80%		%change in significance (by model)		0.00%	-9.09%	-20.00%	
%change in significance (by period)		-87.60%	9.84%	-56.44%	98.91%	**%change in significance (by period)**		-92.59%	-44.44%	-60.00%	73.33%

PANEL C

		SRI stocks: 238						SRI Portfolios: 27			
		Aggregate Period						Aggregate Period			
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	224	80	183		Model 1	Positive	27	9	20	
	Negative	0	69	0			Negative	0	10	1	
	Total	224	149	183			Total	27	19	21	
Model 2	Positive	224	79	191	12	Model 2	Positive	27	11	21	8
	Negative	0	69	0	51		Negative	0	10	2	9
	Total	224	148	191	63		Total	27	21	23	17
%change in significance (by model)		0.00%	-0.67%	4.37%		%change in significance (by model)		0.00%	10.53%	9.52%	
		Non-crisis Period						Non-crisis Period			
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	235	78	124	0	Model 1	Positive	27	9	17	
	Negative	0	82	11			Negative	0	10	3	
	Total	235	160	135			Total	27	19	20	
Model 2	Positive	237	76	133	18	Model 2	Positive	27	11	17	8
	Negative	0	83	7	27		Negative	0	10	3	8
	Total	237	159	140	45		Total	27	21	20	16

%change in significance (by model)		0.85%	-0.63%	3.70%		%change in significance (by model)		0.00%	10.53%	0.00%	
		Crisis period						Crisis period			
		XMKT	SMB	HML	LEV			XMKT	SMB	HML	LEV
Model 1	Positive	8	36	222		Model 1	Positive	0	3	27	
	Negative	10	12	0			Negative	0	1	0	
	Total	18	48	222			Total	0	4	27	
Model 2	Positive	12	39	219	28	Model 2	Positive	0	2	27	7
	Negative	14	15	0	12		Negative	0	2	0	0
	Total	26	54	219	40		Total	0	4	27	7
%change in significance (by model)		44.44%	12.50%	-1.35%		%change in significance (by model)		0.00%	0.00%	0.00%	
%change in significance (by period)		-89.03%	-66.04%	56.43%	-11.11%	**%change in significance (by period)**		-100.00%	-80.95%	35.00%	-56.25%

Table-12
Partial f-statistics testing for the significance of contribution made by the LEV factor for conventional, Islamic and SRI portfolios.

Old Model

$$r_{it} - r_{ft} = \beta_0 + \beta_1(r_{mt} - r_{ft}) + \beta_2 R_{t,SMB} + \beta_3 R_{t,HML} + \varepsilon_t$$

$$\varepsilon_t \,|\, \psi_{t-1} \sim N(0, \sigma_t^2),$$

$$\sigma_t^2 = \Omega + \sum_{i=1}^{q} \alpha_i \varepsilon^2{}_{t-i} + \sum_{j=1}^{p} \delta_i \sigma_{t-j}$$

New Model

$$r_{it} - r_{ft} = \beta_0 + \beta_1(r_{mt} - r_{ft}) + \beta_2 R_{t,SMB} + \beta_3 R_{t,HML} + \beta_4 R_{t,LEV} + \varepsilon_t$$

$$\varepsilon_t \,|\, \psi_{t-1} \sim N(0, \sigma_t^2),$$

$$\sigma_t^2 = \Omega + \sum_{i=1}^{q} \alpha_i \varepsilon^2{}_{t-i} + \sum_{j=1}^{p} \delta_i \sigma_{t-j}$$

where, r_i is the return on portfolio i; r_f is the return on the risk free asset and r_m is the return on the market portfolio. $R_{\mathrm{SMB}}$is the return on the size mimicking portfolio constructed by taking the simple average of the returns each week of all "small" portfolios minus "big" portfolios. R_{HML} is the return on book to market mimicking portfolio constructed by taking the simple average of the returns each week of all "high BE/ME" portfolios minus "low BE/ME" portfolios. $R_{\mathrm{LEV}}$is the return on leverage mimicking portfolios constructed by taking the simple average of the returns each week of all "high leverage" portfolios minus "low leverage portfolios". All indicated coefficients with (*) are significant at 5% level of significance. Partial f-statistics and the p-values test for the significance in the contribution of R-square made by the new model (which includes the LEV factor). GARCH models are estimated using the Bollerslev-Wooldridge corrections to the standard errors. Model 1 excludes LEV. Model 2 includes LEV. Coefficients of the GARCH variance equations are not reported to conserve space. They are available upon request.

Table-12 *(continued)*

	Conventional Portfolios			Islamic Portfolios			SRI Portfolios		
Portfolio	Aggregate Period Partial f-statistic	Non-crisis Period Partial f-statistic	Crisis Period Partial f-statistic	Aggregate Period Partial f-statistic	Non-crisis Period Partial f-statistic	Crisis Period Partial f-statistic	Aggregate Period Partial f-statistic	Non-crisis Period Partial f-statistic	Crisis Period Partial f-statistic
1	21.91*	-1.27	69.32*	-9.88	40.84*	20.16*	43.73*	24.27*	2.56
2	34.89*	5.64*	83.46*	16.99*	-0.38	45.00*	0.86	0.74	-2.26
3	59.14*	17.21*	119.34*	92.84*	53.73*	51.58*	1.26	37.32*	1.22
4	4.67*	-0.71	25.16*	-3.19	6.05*	24.07*	29.93*	18.52*	0.12
5	8.03*	-0.21	51.10*	7.80*	0.02	20.48*	-1.26	0.02	-1.37
6	28.87*	4.78*	95.20*	16.85*	-0.50	43.11*	-3.29	20.11*	-2.12
7	6.48*	0.03	21.11*	-5.00	13.93*	17.95*	39.16*	22.08*	4.96*
8	12.42*	1.32	80.78*	-10.27	2.37	36.12*	3.40	0.46	-1.58
9	73.34*	45.25*	110.37*	11.15*	0.00	102.05*	-16.20	16.59*	6.18*
10	39.51*	0.63	71.80*	-8.71	21.96*	38.52*	17.58*	8.50*	0.08
11	37.85*	7.25*	74.64*	-3.90	5.45*	34.93*	2.31	0.13	-0.48
12	107.88*	39.23*	96.55*	12.21*	0.02	47.64*	-3.58	13.58*	0.42
13	21.39*	1.59	35.39*	-9.71	6.82*	22.37*	16.78*	1.64	2.30
14	44.05*	9.55*	82.74*	7.34*	-0.35	35.52*	4.54*	0.87	-2.03
15	57.86*	14.22*	98.65*	36.39*	10.23*	57.74*	-8.10	7.48*	-0.94
16	5.55*	2.44	29.10*	-1.82	14.17*	15.63*	16.09*	-0.36	1.87
17	36.48*	4.02*	109.43*	4.21*	0.32	38.63*	4.81*	1.16	-0.16
18	49.86*	19.90*	103.38*	30.52*	2.30	74.60*	-6.02	15.96*	4.00*
19	0.84	-2.49	65.33*	-15.51	40.79*	45.68*	45.41*	39.12*	-0.74
20	27.10*	6.44	72.09*	35.40*	6.89*	44.07*	3.41	-2.41	-1.16
21	108.17*	29.41*	69.69*	26.46*	2.18	48.00*	-7.28	16.48*	-0.76
22	-8.32	-5.24	48.33*	-10.31	2.29	10.15*	22.20*	6.17*	-0.59
23	92.18*	24.24*	79.91*	22.92*	5.23*	39.53*	0.15	0.56	-0.66
24	98.98*	29.60*	45.80*	36.11*	4.99*	72.64*	-1.92	0.55	1.66
25	-5.79	13.44*	20.00*	54.37*	108.31*	3.51	53.43*	71.05*	2.78
26	25.65*	2.07	77.86*	19.86*	0.54	43.08*	-2.53	1.10	-0.97
27	258.76*	81.47*	134.57*	88.06*	47.13*	92.43*	3.03	53.30*	-0.37

RESOLUTIONS OF OIC *FIQH* ACADEMY

Islamic Economic Studies
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Resolution of OIC Fiqh Academy
(related to Islamic Economic and Finance)

بسم الله الرحمن الرحيم

Resolution 165(18/3)

on

Activation of the Role of *Zakāt* in Fighting Poverty and Organization of its Collection and Disbursement Drawing on Jurisprudential Interpretations

The Council of the International Islamic Fiqh Academy of the Organization of Islamic Cooperation, meeting in its Twenty Eighth Session in Putrajaya, Malaysia, from 24 to 29 Jamada II 1428H (9-14 July, 2007),

Having regard to the research papers received by the Academy on the issue of "Activation of the Role of *Zakāt* in Combating Poverty and Organization of its Collection and Disbursement Drawing on Jurisprudential Interpretations; and having listened to the deliberations on the issue,

DECIDES the following:

First: Categories of contemporary assets are subject to interpretation concerning whether or not they are eligible for *Zakāt*, provided that the opinions offered are governed by Sharīʿah interpretation criteria.

Second: The giver of *Zakāt* is not obliged to cover all the categories of *Zakāt* when distributing *Zakāt*.

However, if the Imam or his representative is the distributor of *Zakāt* funds, consideration should be given to all categories of *Zakāt* where resources are available, the need exists and the eligible recipients can be reached.

Third: The Basic rule is that *Zakāt* is paid when it falls due or when it is collected. Disbursement may be deferred for a particular benefit such as waiting for a needy impoverished relative or paying it periodically to meet the recurring living expenses of the poor.

Fourth: **Fund for the Poor and the Needy**:

- *Zakāt* is paid to the poor and needy to meet their needs and maintain sufficiency and support their dependents as far as possible, in accordance with the discretion of the authorities in charge of *Zakāt*.
- If the person is a workman, *Zakāt* is paid to him to buy the tools of his trade. If he is poor but skilled in trading he is given *Zakāt* to trade. If he is poor and has farming skills, he given a farmland to farm and live on its produce. Drawing on that, *Zakāt* funds can be employed in small scale industries such as units for weaving, home tailoring, small vocational workshops which may be owned by the poor and the needy.
- Productive and service projects may be established through *Zakāt* funds in accordance with Resolution No.15 (3/3) of the Academy.

Fifth: **Other *Zakāt* Recipients**:

(a) Collectors of *Zakāt*

(1) Those working in *Zakāt* collection include, in contemporary applications, institutions, departments, and other facilities delegated to collect *Zakāt* from the rich and distribute the funds to the poor in accordance with Sharīʿah regulations.

(2) It is necessary for the institution of *Zakāt* to enjoy financial and administrative independence from other organs of the state remaining under supervision and control in order to ensure transparency and to implement administrative regulations.

(3) Institutions duly authorized to collect *Zakāt* funds and distribute them are trustworthy and do not assume the responsibility to compensate for funds disposed of save in cases of infringement and negligence. By giving *Zakāt* to

such institutions the *Zakāt* giver fulfills his obligation and receives acquaintance.

(b) Those whose hearts are inclined towards Islam

(1) The share of those whose hearts are inclined towards Islam continues to be valid as long as life continues as it has not been annulled and will be used as the need and interest arise. Wherever there is that need and interest, this share will be used.

(2) *Zakāt* may be given to bring closer the hearts of those who have just converted to Islam to strengthen their faith and to compensate them for whatever they might have lost in the process. An unbeliever could be given *Zakāt* money if there is hope that he may become a Muslim or to ward off his evil intents from Muslims.

(3) Support could be given from *Zakāt* money to help non-Muslims affected disasters such as earthquakes, floods and droughts as a means of bringing their hearts closer.

(c) Ransoming of Slaves

(1) The share of ransoming of slaves includes redemption of Muslim captives.

(2) *Zakāt* money may be used to free Muslim abductees as well their families from kidnappers.

(d) Debtors

The share of debtors includes those who are confirmed to have run up personal debts or those who are indebted because they borrowed to bring reconciliation between people in accordance with Sharīʿah criteria. This includes payment of blood money imposed on those who have been convicted of accidental homicide and who have no bloodwite to pay off, and the debts owed by the dead who have no estate to pay off the debt if have not already been paid from the public treasury (*Baytul Māl*)

(e) In the Cause of Allah:

This share includes fighters for the cause of Allah (*mujahideen*) and in the defense of country, as well as for different legitimate wars.

(f) Ibn-Sabil (the wayfarer)

(1) Is a traveler whose travel is not for sinful purposes and who has no wherewithal to take him back home even if such a traveler is a wealthy person in his country.

(2) Giving financial assistance through the establishment of a fund to assist displaced persons inside their own countries or abroad because of wars, floods, earthquakes, famine situations, etc.

(3) Assist poor students who are not on scholarships outside their countries in accordance with the criteria applied in this regard.

(4) Migrants with no regular residence status outside their countries and are stranded may be given *Zakāt* money to enable them return to their countries.

(5) Meeting the needs of knowledge seekers and travelers without the wherewithal to sustain themselves.

Recommendations:

In view of the need of the Islamic *Ummah* to organize *Zakāt* institutionally in terms of collection and spending in a modern and disciplined manner compatible with the Islamic Sharīʿah rules, the Council of the Academy calls upon the competent *Zakāt* authorities in the entire Islamic World to coordinate among themselves and work towards the establishment of joint projects to assist the poor and the needy.

The Academy also recommends the following:

(1) URGE individual Muslims to pay their *Zakāt* to the bodies that are established by state authority in order to ensure that it reaches the eligible recipients, and to activate the religious, developmental, social and economic role of *Zakāt*.

(2) USE all audio and visual media outlets to educate the community on the importance and the constructive role of *Zakāt* in improving economic and social conditions.

(3) DEVELOP Sharīʿah compatible accounting criteria for the *Zakāt* pool.

(4) DEVELOP *Zakāt* accounting models as guidelines to every *Zakāt* pool which assist in practical application in light of *Zakāt* Sharīʿah criteria.

(5) USE the information technology industry, communications networks and satellite channels to enlighten Muslims about contemporary *Zakāt* Issues and its role in the realization of social and economic development the Islamic *Ummah*.

(6) URGE states to reduce taxes on *Zakāt* payers by deducting their contribution towards *Zakāt* from the taxes levied on them as a way of encouraging wealthy Muslims to pay their *Zakāt* money.

(7) INTRODUCE the teaching of *Zakāt* jurisprudence and accounting pillar of Islam at universities and institutes.

Allah Knows Best

بسم الله الرحمن الرحيم

Resolution 167(18/5)

On

The Aims of Sharīʿah and its Role in Deriving Rules

The Council of the International Islamic Fiqh Academy (IIFA) of the Organization of the Islamic Conference meeting in its Eighteenth Session in Putrajaya, Malaysia, from 24 to 29 Jumada II 1428H (9-14 July, 2007);

Having regard to the research papers received from the Academy on the question of "The Aims of Sharīʿah and its Role in Deriving Rules", and having listened to the deliberations on it,

DECIDES the following:

First: The "Aims of Sharīʿah" are the meanings and the general wisdom and goals which achieve "The Legislator's" design for the benefit of man in this world and in the hereafter.

Second: Taking the aims into account in "*Ijtihād*" (interpretative jurisprudence) serves many functions, such as:

(1) A holistic perspective on the texts and rules of Sharīʿah.

(2) The principle of the "Aims of Sharīʿah" is a decisive factor that must be taken into account when differences of opinion occur between jurists.

(3) Providing insight into the deeds of Muslims who have come of age religiously and apply Sharīʿah judgment on them.

Third: Consideration of the Aims of Sharīʿah at its different levels the basic and appropriate framework for human rights.

Fourth: The importance of referring to the Aims of Sharīʿah in the process of *ijthād*.

Fifth: Correct employment of the Aims does not in any way invalidate the significance of the true nature of Sharīʿah texts.

Sixth: The importance of examining the different dimensions of the Aims of Sharīʿah in the social, economic, educational and political areas and otherwise.

Seventh: The importance of employing Aims of Sharīʿah in the real understanding of the legal message.

Eighth: The importance of the functions of the Aims of Sharīʿah in applying Sharīʿah rules on current occurrences and contemporary financial transactions and otherwise to differentiate between Islamic forms of products and existing conventional ones.

The Academy recommends the following:

(1) CALLS UPON the Academy Secretariat to commission additional research to identify the Aims of Sharīʿah and the efforts being made by scholars and researchers in this respect.

(2) CALLS UPON educational institutions and centers to introduce the teaching of the Aims of Sharīʿah in their educational curricula.

Allah Knows Best

EVENTS AND REPORTS

Islamic Economic Studies
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Policy Workshop on

Challenges to Affordable Housing Finance in IDB Member Countries

Islamic Development Bank's research and training arm, the Islamic Research and Training Institute (IRTI) on 15 September 2012, Saturday hosted a one day workshop which saw into the "Challenges to Affordable Housing Finance in IDB Member Countries" Chaired by Dr. Azmi Omar, Director General, IRTI, the event which also saw the launching of a book under the same title, reviewed different aspects to suitable and affordable accommodation in IDB Member Countries. "The book is a tangible example of policy studies where IDB Member Countries can practically take advantage of them and implement the recommendations therein in dealing with the issue of affordable housing finance through Islamic modes", stated Dr. Azmi Omar.

Housing experts and consultants from the World Bank, State Bank of Pakistan as well as professionals from the finance industry and IDB Group entities discussed the issue and the way forward during the workshop.

According to Dr. Nasim Shirazi (IRTI), a speaker at the event and a co-author of the book, the current population of IDB member countries amounts to nearly 1.6 billion (2011) while the rapid growth in population would set the figure to an expected 1.9 billion by the year 2020 and 2.7 billion by the year 2050. "As per UN Habitat estimates", said Dr. Shirazi, "IDB Member Countries need 8.2 million housing units per year or 22,421 units per day." Mr. Abdul Kadir Thomas of SHAPE Financial Inc., presented the result of the survey and SWOT analysis of various housing finance products that are available in Islamic and conventional finance. Mr. Ashraf Khan from State Bank of Pakistan discussed case study of affordable housing finance in Pakistan and the challenges faced there. Mr. Zaigham Mahmoud Rizvi, Consultant World Bank, provided insights on how other Multilateral Development Banks are trying to address the issues of housing and housing sector development.

The second session chaired by Dr. Ahmed Iskanderani, Director Research and Advisory Services Department, IRTI, focused on the possible role of IDB. Dr. Salman Syed Ali, a co-author and team leader for the project, discussed the roles that can be played by IDB and the member countries themselves to facilitate development of housing finance using Islamic modes. Mr. Sohail Mitha from Infrastructure Department of IDB and Mr. Saeed Ahmed from ICD informed about the work that IDB and ICD are already doing in housing finance and housing sector development. Since its inception IDB has financed 38 housing or housing related projects worth around US$ 740.79 million.

The Workshop concluded that lack of required infrastructure, problems of establishing clear ownership, difficulties in registration and title transfer processes as well as inadequacy of long term housing finance make up part of the challenges and constraints to affordable housing in a number of IDB Member Countries. In order to develop housing sector three sets of actions are needed upfront by the member countries as well as by IDB: (1) settle on a suitable business model, (2) chose appropriate Islamic financial products, and (3) initiate reforms in legal and infrastructure institutions to facilitate these models and financial products. Efforts of the member countries together with IDB on the above lines can help make housing available on affordable terms.

The book launched at the event is a joint effort by IRTI and IDB's Economic Research and Policy Department (ERPD) in collaboration with SHAPE Financial Corp. It is available for downloading from publications tab on IRTI website (www.irti.org).

Zakāh Management for Poverty Alleviation

Managing *zakāh* for alleviation of poverty, however, involves many challenges. Institutions that rely on *zakāh* and *ṣadaqah* as their primary source of funding must address the issue of sustainability. This is possible only if they are perceived as highly credible institutions. A sustained flow of *zakāh* funds demands high degrees of integrity, transparency and professionalism in the management of funds. Related to this is the institutional need for adequately trained professionals and managers well-versed in the Sharīʿah aspects of *zakāh* as well as in scientific techniques of management of charity-based and not-for-profit institutions.

Realizing that human resource development for the Islamic charity-based and not-for-profit organizations constitutes a major challenge to their survival and growth, the Islamic Research and Training Institute has embarked on an ambitious

activity to develop a series of training manuals intended for use by training organizations in this sector. The present manual on *Zakāh Management for Poverty Alleviation* is the first in this series. It has the following modest objectives: (i) to serve as core learning package for training in the field of *zakāh* management; (ii) to add to the supply of trained *zakāh* professionals; (iii) to provide respectability and professionalism to the profession of *Āmil Zakāh*; and (iv) to serve as a tool of advocacy with government policy makers and regulators, specifically in IsDB member countries for consideration of *zakāh* as a strategic poverty alleviation tool.

This manual on *Zakāh* Management for Poverty Alleviation is divided into seven stand-alone modules. Module One titled "What the Poor Need" provides the participants with an appreciation of the challenge of poverty and the role of financial and non-financial services in addressing this challenge. Module Two describes the Islamic Approach to Poverty Alleviation seeking to provide the participants with an understanding of why poverty alleviation is a key objective of Islamic Sharīʿah and how it is sought to be achieved. Module Three titled "how to estimate *zakāh* liability" seeks to strengthen the participants' knowledge and skills in estimating *zakāh* liability of individuals and businesses, provide a thorough knowledge of fiqhi rules of *zakāh* and their implications for *zakāh* liability. Module Four titled "how to distribute *zakāh* aims to strengthen the participants' knowledge of Sharīʿah rules regarding utilization of *zakāh*, the eligibility criteria of beneficiaries and related issues. Module Five deals with issues in how to expand outreach and the role of various stakeholders in the process, such as, the government, the Islamic networks, the Islamic charity organizations, the Islamic scholars and activists, the *zakāh* professionals, the Islamic banks & microfinance institutions, the *zakāh* payers and the *zakāh* beneficiaries. Module Six deals with the important issue of how *zakāh*-based institutions may enhance credibility through better accountability, transparency and governance. Finally, Module Seven discusses how to design, implement and evaluate performance of *zakāh*-financed economic empowerment programs involving micro-credit, micro-equity and micro-*takāful*.

The manual suggests that while lecture-discussions will be conducted by experts or resource persons to explain the concepts, principles and best practices in *zakāh* management, these need to be supplemented by Question and Answer (Q&A) sessions that will give the participants the opportunity to elaborate and clarify significant issues and concerns on the given topic. Sharing by participants of their experiences from their respective organizations or countries will enable cross-learning among the participants on the various methods and practices flourishing in different cultures and regions. The Group Assignments will be

conducted to give way for the participants to apply or express their internalized and assimilated knowledge during the lecture and discussion sessions. Finally, the manual prescribes field visits to *zakāh* organizations in the region to enrich learning from the lectures and workshops with the reality of actual field operations and the application of best practices, thus validating how these concepts are working. Evaluation of the sessions and other activities of the training will also form part of the program. Considering the broad coverage of *zakāh*, the concentration of the contents of the training package is mostly confined to practical issues in mobilization and utilization of *zakāh* from the stand point of not-for-profit organizations (NPOs) engaged in poverty alleviation initiatives.

This manual is intended for professionals, key officials, managers and training specialists involved in the implementation of *zakāh* collection and distribution programs. It provides the tools for the trainer to deliver the entire course in a way that stimulates adaptation and learning. It will also enable the trainee to gain an understanding of and enhance his/her skills in *zakāh* management. It is hoped that this publication would further contribute to the wealth of knowledge on *zakāh* management and form the basis of a more extensive text on management of Islamic charity.

ANNOTATED LIST OF IRTI'S RECENT PUBLICATIONS

Islamic Economic Studies
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Occasional Paper

Challenges of Affordable Housing Finance in IDB Member Countries Using Islamic Modes

Edited by

Nasim Shah Shirazi, Muhammad Zulkhibri, Salman Syed Ali &
SHAPE Financial Corp.

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Housing is one of the basic needs. It is linked with many other sectors of the economy and any change in it affects the whole economy and some time the whole world – a case of US subprime crisis. Promoting this sector consequently promotes employment, consumption and investment in the economy.

Although housing is of tremendous importance for the families, society and for the economy at large, the fact remains that all the developing countries including the IDB member countries have been facing severe shortage of housing. Using UN-Habitat (2006) methodology, indicative estimates suggest that the IDB member countries need around 8.2 million houses per year to accommodate poor and low income urban people. This translates into nearly 22,421 dwellings per day in order to accommodate the expected urban population growth. MENA requires 3.2 million housing units per year followed by ASIA (2.7 million), Sub-Sahara Africa (1.9 million) and Countries in Transition (CIT) (0.4 million). This projected figure of housing needs is expected to increase (at an average of 2.83 percent annually) along with the increase in the urban population in IDB member countries

A number of factors constrain the supply of housing especially in the urban cities. Not only the availability of land, but poor quality of infrastructure also affects the supply of affordable housing. Non-transparent ownership, vague property rights, weak legal and regulatory framework and ineffective foreclosures laws, ineffective land registration system, high transaction costs, and inadequate long term housing finance funds have been the major issues of the housing sector.

The registration and Title transfer of property are cumbersome in most of the member countries. In Brunei, registering a property involves seven procedures and takes 298 days. Saudi Arabia gets rank one in the world for easy transfer of titles with only two procedures, no transfer cost and it takes only 2 days to transfer the title of property. The cost to register a property and title transfer is low in some countries, like Kazakhstan (0.1%), Qatar (0.3 %), and Azerbaijan (0.2 %) compared to other member countries like Syria (27.9%) and Nigeria (20.8%), etc. Foreclosure on property is ineffective in most of the member countries; it takes longer time and involves high costs.

A strong primary mortgage market is needed to finance the ever-increasing demand for housing. To facilitate the primary mortgage providers and solve their liquidity problem, a well-developed mortgage industry that include long term financing institutions and markets is needed. However, this industry is not developed in most of the member countries. Some IDB member countries have recently taken the initiative to establish refinance companies for solving the liquidity problem of the primary mortgage market. In Malaysia, the establishment of Cagamas Berhad (Cagamas) has been very successful in promoting secondary mortgage market. The member countries can learn the best practices of Cagamas for the development of their secondary mortgage market.

Many mortgage instruments- with different interest rates and maturity- are available across the countries to cater for the varying needs of the borrowers and lenders. But all these products are interest based and not suitable for Muslim borrowers. However, lesson could be learned from the widely-practiced traditional mortgages for the development of Islamic home mortgage products. Several Islamic modes of housing finance exist in the market. *Mushārakah Mutanaqisah* (diminishing partnership or Diminishing Balance Partnership; DBP) is the most widely used mode of housing finance followed by *Ijārah* and *Murābaḥah* for completed properties. For property under construction, *Ijārah Mawsoofa Bi Dhimma* (IBMD) is the most widely used followed by DBP and *Istiṣnā* .

The study suggests four models including cooperative model, Compulsory Saving for Housing (CSH) schemes, Real Estate Investment Trust (REIT) and the

Public Private Partnership (PPP) model. To implement these models in Sharīʿah compliant manner, appropriate tool or product is needed that allow for adjustment to different circumstances, across markets and within customers' needs, and provide multiple liquidity and exit strategies. The study proposes DBP model. The DBP is considered optimal model, which gives investors control over the real estate in environments with weak mortgage laws. This also gives maximum flexibility to manage client needs and client difficulties. The *Mushārakah* base allows for easier monetization compared to other methods, indeed, it creates more tools facilitating securitization.

To overcome the challenges and issues faced by the IDB MCs, the paper proposes that MCs change manual registration of property to electronic registration, which will make the registration process simple by reducing the number of processes and make the costs of transactions reasonable. MCs may allow the registration department to certify the documents rather than involving notaries. This will also cut the procedure involved in and the cost associated with it. They may empower their financial institutions to foreclose the mortgage property without recourse to court, which will reduce the foreclosure time and cost. Furthermore, MCs may promote secondary mortgage market to enhance liquidity in the mortgage market.

The housing sector is too large for any financial institution or government to finance alone. Many of the constraints highlighted above may be addressed with the assistance of multi-lateral development banks including the IDB. Their core competencies include providing guarantees, funding long term infrastructure, and even providing support to nascent capital market. The IDB being a multilateral development bank can play a great role for the development of the housing sector in its member countries through utilizing Islamic modes of finance. In the past, the IDB has financed several housing projects in IDB member countries, partly under the real estate, education, water, sanitation and urban services and social services sector. Since its inception, the IDB has financed 38 housing or housing related projects worth around US$740.79 million.

IDB can encourage and strengthen the housing finance providers through equity. It can help the member countries for establishing and strengthening the secondary market through securitizing the housing finance provided by the funding institutions. The IDB may facilitate developers through creating a special fund for housing projects in the selected member countries and the successful experience, if obtained, be extended and replicated for housing projects development in other member countries.

IDB may further develop Islamic products, which cater for varying needs of the customers. IDB can assist the member countries through providing technical assistance in areas of prudential regulations, mortgage guidelines and mortgage laws.

To overcome the information problem in long term housing finance, the IDB may encourage its member countries to gather information related to different housing events, best practices, reforms and other steps, if any, taken by them and made available to all member countries for the sake of learning and implementation.

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☐ **ADVANCES IN ISLAMIC ECONOMICS AND FINANCE, (2007),** Vol. 1, pp. 532. **Price $ 20.0**
Munawar Iqbal, *Salman Syed Ali* and *Dadang Muljawan* (ed).,
Islamic economics and finance are probably the two fields that have provided important new ideas and applications in the recent past than any of the other social sciences. The present book provides current thinking and recent developments in these two fields. The academics and practitioners in economics and finance will find the book useful and stimulating.

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This book brings together studies that analyze the issues in product innovation, regulation and current practices in the context of Islamic capital markets. It is done with a view to further develop these markets and shape them for enhancing their contribution in economic and social development. The book covers *ṣukūk*, derivative products and stocks in Part-I, market development issues in Part-II, and comparative development of these markets across various countries in Part-III.

☐ **ISLAMIC FINANCE FOR MICRO AND MEDIUM ENTERPRISES, (1432, 2011),** pp 264 **Price $ 30.0**
Mohammed Obaidullah & Hajah Salma Haji Abdul Latiff
This book is the outcome of First International Conference on "Inclusive Islamic Financial Sector Development: Enhancing Islamic Financial Services for Micro and Medium Sized Enterprises" organized by Islamic Research and Training Institute of the Islamic Development Bank and the Centre for Islamic Banking, Finance and Management of Universiti Brunei Darussalam. The papers included in this volume seek to deal with major issues of theoretical and practical significance and provide useful insights from experiences of real-life experiments in Sharīʿah -compliant MME finance.

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Mohammed Obaidullah

The book proposes a two-pronged strategy to poverty alleviation through micro-enterprise development based on the dichotomy between livelihood and growth enterprises. With a focus on provision of Sharīʿah-compliant financial services for micro-enterprises, it reviews thematic issues and draws valuable lessons in the light of case studies from three IsDB member countries – Bangladesh, Indonesia, and Turkey.

☐ **ISLAMIC ECONOMICS IN A COMPLEX WORLD: AN EXTRAPOLATION OF AGENT-BASED SIMULATION, (2008), pp. 149**

Sami Ibrahim al-Suwailem

This research paper (book/occasional paper) discusses the possible use of recent advances in complexity theory and agent-based simulation for research in Islamic economics and finance

☐ **ISLAMIC MICROFINANCE DEVELOPMENT: INITIATIVES AND CHALLENGES (Dialogue Paper No. 2), (2008), pp. 81.**

Mohammed Obaidullah and Tariqullah Khan

This paper highlights the importance of microfinance as a tool to fight poverty. It presents the "best practices" models of microfinance and the consensus principles of microfinance industry.

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M. Umer Chapra

This paper asserts that comprehensive vision of human well-being cannot be realised by just a rise in income and wealth through development that is necessary for the fulfilment of basic needs or by the realization of equitable distribution of income and wealth. It is also necessary to satisfy spiritual as well as non-material needs, not only to ensure true well-being but also to sustain economic development over the longer term.

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Mohammed Saleh Ayyash

This book attempts to analyse the essential aspects of social responsibility of Islamic Banks and the means to achieving them. Apart from encapsulating the Sharīʿah formulation of the social responsibility and its relation to the objectives of Sharīʿah, the book also addresses the linkage between social responsibility and the economic and social development of Muslim communities. Furthermore, it demonstrates the impact of the nature of social and developmental role which should be undertaken by Islamic banks, not only for achieving socio-economic development but also for making the earth inhabitable and prosperous.

☐ **ISLAMIC BANKING STRUCTURES: IMPLICATIONS FOR RISK AND FINANCIAL STABILITY, (1432, 2011),** pp 50 **Price $ 10.0**

Abd Elrahman Elzahi Saaid Ali

The results of this research are expected to be valuable to the management of Islamic banks and to those who are engaged in the fields of Islamic banking and finance.

☐ **HANDBOOK OF ISLAMIC ECONOMICS, Vol. 1, Exploring the Essence of Islamic Economics, (1432, 2011),** pp.348 **Price $ 30.0**

Habib Ahmed & Muhammad Sirajul Hoque

This "Handbook of Islamic Economics" is part of the project to make important writings on Islamic economics accessible by organizing them according to various themes and making them available in one place. The first volume of this Handbook subtitled "Exploring the Essence of Islamic Economics" collects together the eighteen important articles contributed by the pioneers of the subject and presents them under four broad themes: (i) Nature and Significance of Islamic Economics, (ii) History and Methodology, (iii) Sharīʿah and *Fiqh* Foundations, (iv) Islamic Economic System.

☐ **BUILD OPERATE AND TRANSFER (BOT) METHOD OF FINANCING FROM SHARĪʿAH PERSPECTIVE, (1433, 2012),** pp.115 **Price $ 10.0**

Ahmed Al-Islambouli

Literature on BOT techniques from Sharīʿah perspectives are few and far between. This book surveys and reviews the previous studies as well as experiences of BOT financing by individuals and institutions and concludes with a Sharīʿah opinion. It finds BOT to be a combination of *istiṣnāʿ* and other contracts. The BOT would be a valid method after appropriate modifications

☐ **CHALLENGES OF AFFORDABLE HOUSING FINANCE IN IDB MEMBER COUNTRIES USING ISLAMIC MODES (1433, 2012),** pp.266 **Price $ 20.0**

Nasim Shah Shirazi, Muhammad Zulkhibri Salman Syed Ali & SHAPE Financial Corp.

The focus of this book is on financial products and infrastructure innovation for housing finance. It quantifies the demand for housing in IDB member countries, estimates the financial gap, and evaluates the current Islamic house financing models and practices in the IDB member countries and elsewhere in the world. It also identifies niche areas where intervention by the IDB Group can promote development of housing sector to meet the housing needs in its member countries.

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Others

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Comme institution consacrée à l'organisation du pèlerinage, TABUNG HAJI (Conseil de Direction des Pèlerins) a servi comme modèle type à cette journée d'étude.

☐ **L'ADMINISTRATION PUBLIQUE DANS UN CONTEXTE ISLAMIQUE (1995),** 150 pages **Prix $ 5.0**
Yassine Essid and *Tahar Mimm,(éd.)*
Outre l'histoire de l'administration en Islam, cet ouvrage traite de nombreux aspects tant théoriques que pratiques de l'administration d'un point de vue islamique et qui touchent à l'actualité du monde islamique.

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Boualem Bendjilali and *Mohamed Alami (éd.)*
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Mohamed Ariff and *M.A. Mannan* (éd.)
Actes de séminaire dont l'objectif principal était d'identifier les voies et moyens pour l'émission d'instruments financiers islamiques viables qui pourraient préparer le terrain à une mobilisation efficace des ressources financières dans les pays membres de la BID.

☐ **INTRODUCTION AUX TECHNIQUES ISLAMIQUES DE FINANCEMENT (1997),** 210 pages **Prix $ 10.0**
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Actes de séminaire sur la promotion et financement des micro-entreprises qui peuvent être utiles à tous ceux, décideurs, hommes et femmes du terrain, soucieux de faire de la micro-entreprise un outil efficace et durable de lutte contre la pauvreté.

☐ **LA ZAKAT ET LE WAQF : ASPECTS HISTORIQUES, JURIDIQUES, INSTITUTIONNELS ET ECONOMIQUES (1998),** 387 pages **Prix $ 10.0**
Boualem Bendjilali (éd.)
Actes de séminaire qui visent à faciliter l'accès des lecteurs francophones à la littérature sur l'économie islamique en général et la Zakat et le Waqf en particulier.

☐ **LES MODES DE FINANACEMENT ISLAMIQUES (1993)**, 48 pages **Prix $ 5.0**
Boualem Bendjlali (éd.)
Rapport d'un séminaire sur les modes de financement islamiques tenu en Mauritanie en 1413H (1992).

☐ **LES SCIENCES DE LA CHARI'A POUR LES ECONOMISTES: LES SOURCES DU FIQH, SES PRINCIPES ET SES THEORIES; LE FIQH DES TRANSACTIONS FINANCIERES ET DES SOCIETES; ET SON APPLICATION CONTEMPORAINE (2001),** 572 pages **Prix $ 15.0**
Boualem Bendjilali (éd.)
Actes de séminaire sur les sciences de la Chari'a pour les économistes dont l'objectif principal est de servir comme outil de base aux chercheurs, étudiants et enseignants en économie islamique sur les sources du *Fiqh.*

Recherches

☐ **LA COOPERATION ECONOMIQUE ENTRE LES PAYS DU MAGHREB (1985),** 138 pages **Prix $ 5.0**
Ridha Saadallah
Cet ouvrage traite de nombreux thèmes dont les ressources naturelles et humaines au Maghreb, le potentiel de coopération agricole et industrielle au Maghreb, etc.

☐ **PROFITS ET INTERETS BANCAIRES ENTRE L'ANALYSE ECONOMIQUE ET LA CHARI'A (1994),** 150 pages **Prix $ 5.0**
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Cet opuscule traite de l'intérêt bancaire face au profit en tant que mécanismes de gestion de l'activité économique. Une analyse de deux points de vue différents, celui de l'économie conventionnelle et celui de la Chari'a.

☐ **LA MOUDHARABA SELON LA CHARI'A ET SES APPLICATIONS CONTEMPORAINES (1994),** 83 pages — **Prix $ 5.0**
Hassan El-Amin
Cette étude traite de nombreux aspects pratiques: légal, économique et bancaire.

☐ ***JOUALA* ET *ISTISNA,*** — **Prix $ 5.0**
***Analyse juridique et économique* (1994) ,** 65 pages
Chaouki Ahmed Donia
L'intérêt de cette recherche réside dans le fait qu'elle aborde un nouveau domaine d'application des transactions économiques islamiques se basant sur deux contrats, à savoir "La Jouala et L'Istisna".

☐ **LA PROPRIETE FONCIERE EN ISLAM (1994) *(Enquête),*** 52 pages — **Prix $ 5.0**
Mahmoud A. Guilaid
Le but de cette étude est d'examiner les questions les plus importantes concernant le droit de propriété foncière en Islam.

☐ **LES RELATIONS COMMERCIALES ENTRE LE CONSEIL DE COOPERATION DU GOLFE ET LA COMMUNAUTE EUROPEENNE (1995),** 152 pages, — **Prix $ 5.0**
Du Passé Récent au Lendemain de 1992
Ridha Mohamed Saadallah
Cette étude procède à une analyse minutieuse des statistiques passées, des échanges commerciaux entre les pays du CCG et ceux de la Communauté Européenne en vue de dégager les tendances profondes et les caractéristiques structurelles du commerce Euro-Golfe.

☐ **ERADICATION DE LA PAUVRETE ET DEVELOPPMENT DANS UNE PERSPECTIVE ISLAMIQUE (1995),** 180 pages — **Prix $ 5.0**
Abdelhamid Brahimi
Cette recherche, divisée en deux parties, traite dans la première des facteurs internes et externes de blocage et de l'impasse. La seconde est consacrée à la conception et à la mise en oeuvre de politiques économiques dans une perspective islamique.

☐ **JUGEMENT DU TRIBUNAL FEDERALISLAMIQUE DU PAKISTAN RELATIF A L'INTERET *(RIBĀ)* (1995),** 478 pages — **Prix $ 15.0**
Ce document constitue un outil de travail et une référence indispensables à tous ceux, parmi les décideurs politiques et chercheurs dans les pays membres de la Banque, qui sont désireux de voir se développer l'alternative d'un système financier exempt d'intérêt.

Eminents Spécialistes

☐ **LES CONDITIONS MONETAIRES D'UNE ECONOMIE DE MARCHES DES ENSEIGNEMENTS DU PASSE AUX REFORMES DE DEMAIN (1993),** 64 pages — **Prix $ 5.0**
Maurice Allais (Prix Nobel d'Economie - 1988)
L'auteur, dans son examen, critique du système monétaire international, appelle à des réformes tant économiques que morales.

☐ **JURISPRUDENCE DE LA *MASLAHA* ET SES APPLICATIONS CONTEMPORAINES (1995),** 92 pages — **Prix $ 5.0**
Hussein Hamed Hassan
L'étude, présente le point de vue islamique se rapportant à la question de l'intérêt publique, son lien avec la législation, ses conditions et ses dimensions juridiques; avec un certain nombre d'applications contemporaines.

☐ **JURISPRUDENCE DE LA NECESSITE (*FIQH* DE LA *DHARURA*) ET SON APPLICATION DANS LA VIE CONTEMPORAINE : PERSPECTIVE ET PORTEE (1996),** 259 pages — **Prix $ 10.0**
Abd al-Wahab I. Abu Sulayman
Cette recherche sur le *Fiqh de la Dharura* aborde le point de vue de la Chari'a islamique par rapport à la notion de *Dharura* (nécessité), ses conditions et ses perspectives juridiques.

☐ **COOPERATION ECONOMIQUE POUR UNE STABILITE REGIONALE (1996),** 37 pages — **Prix $ 5.0**
Bacharuddin Jusuf Habibie
Cet ouvrage porte sur l'importance coopération économique entre les pays en développement en général et entre les pays islamiques en particulier.

☐ **LE QIYAS ET SES APPLICATIONS CONTEMPORAINES (1996),** 139 pages — **Prix $ 5.0**
Mohamed Mokhtar Sellami
Uni conférence qui traite de l'une des sources de la jurisprudence, reconnue dans la science des fondements du droit sous le nom d'analogie (Qiyâs) et reconnue par l'ensemble des écoles juridiques comme preuve légale et méthode d'extraction des jugements.

Prix de la BID

☐ **LE SYSTEME BANCAIRE ISLAMIQUE : LE BILAN, (1996),** 65 pages — **Prix $ 5.0**
Ziauddin Ahmed
Le but de ce papier est d'examiner et d'évaluer la situation actuelle dans le domaine des banques islamiques aussi bien du point de vue théorique que pratique.

☐ **QU'EST-CE QUE L'ÉCONOMIE ISLAMIQUE? (1996),** 81 pages — **Prix $ 5.0**
Mohammad Umer Chapra
Conférence donnée par Dr. Chapra lauréat du Prix de l'économique islamique 1409H (1989) sur : l'économie conventionnelle et l'économie islamique.

☐ **EVOLUTION DES ACTIVITES BANCAIRES ISLAMIQUES: PROBLEMES ET PERSPECTIVES (1998),** 30 pages — **Prix $ 5.0**
Saleh Kamel
Conférence donnée par Cheikh Saleh Kamel lauréat du Prix de la BID en système bancaire islamique pour l'année 1416H (1995/96). Elle constitue une grande contribution à la compréhension de l'économie et du système bancaire islamiques et à leur évolution.

Traductions

☐ **VERS UN SYSTÈME MONÉTAIRE JUSTE, (1997),** 352 pages **Prix $ 10.0**
Mohammad Umer Chapra
Ce livre développe avec habilité la logique islamique de la prohibition du *Ribā*, et démontre avec rigueur la viabilité et la supériorité du système de financement basé sur la participation au capital.

Documents occasionnels

☐ **DEFIS AU SYSTEME BANCAIRE ISLAMIQUE, (1998),** 90 pages **Prix $ 5.0**
Munawar Iqbal, Ausaf Ahmad et Tariquallah Khan
Le but de ce document occasionnel est que les théoriciens et praticiens dans le domaine bancaire islamique doivent explorer les voies et moyens permettant au système bancaire islamique de soutenir son rythme de progrès au moment où il entre dans le 21ème siècle.

TRANSLITERATION TABLE

Arabic Consonants

- Initial, unexpressed medial and final:

ء	’	د	d	ض	ḍ	ك	k
ب	b	ذ	dh	ط	ṭ	ل	l
ت	t	ر	r	ظ	ẓ	م	m
ث	th	ز	z	ع	ʿ	ن	n
ج	j	س	s	غ	gh	هـ	h
ح	ḥ	ش	sh	ف	f	و	w
خ	kh	ص	ṣ	ق	q	ي	y

- Vowels, diphthongs, etc.

Short	ـَ	a	ـِ	i	ـُ	u
Long	أ	ā	ي	ī	و	ū
Diphthongs	ؤ	aw	ئ	ay		

Notes To Contributors

1. The papers submitted to *IES* should make some noticeable contribution to Islamic economics, either theoretical or applied, or discuss an economic issue from an Islamic perspective.
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9. Articles: Al-Qari, Mohamed Ali (1993), "Towards an Islamic Stock Market", *Islamic Economic Studies*, Vol. 1, No. 1; Books: Khan, A. R. (1993), *Financial Intermediation*, New York: Springer Publishers. Page references to works referred to in the text should take the following form: Al-Qari (1993:17). Citations within the text should follow Harvard APA style.
10. The verses of the Qur'ān quoted should carry *surah* number and *ayah* number as (3:20).
11. Complete reference to the source of ahādith quoted should be given.
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Islamic Development Bank (IDB)

Establishment

The Islamic Development Bank is an international financial institution established in pursuance of the Declaration of Intent issued by the Conference of Finance Ministers of Muslim Countries held in Jeddah in Dhul Qa'dah 1393H (December, 1973). The inaugural Meeting of the Board of Governors took place in Rajab 1395H (July 1975) and the Bank was formally opened on 15 Shawwal 1395H (20 October, 1975).

Vision

By the year 1440H Hijrah, IDB shall have become a world-class development bank, inspired by Islamic principles that have helped significantly transform the landscape of comprehensive human development in the Muslim world and help restore its dignity.

Mission

The mission of IDB is to promote comprehensive human development, with a focus on the priority areas of alleviating poverty, improving health, promoting education, improving governance and prospering the people.

Membership

The present membership of the Bank consists of 56 countries. The basic condition for membership is that the prospective member country should be a member of the Organization of Islamic Cooperation (OIC), pay its contribution to the capital of the Bank and be willing to accept such terms and conditions as may be decided upon by the IDB Board of Governors.

Capital

As of the month of Rajab 1431H, the Authorized Capital of the Bank was ID 30 Billion, and the Issued Capital was ID 18 Billion, of which ID 17.474 Billion was subscribed with ID 4.031 Billion Paid-Up.

Group

At present the IDB Group is made up of Islamic Research and Training Institute (IRTI), International Islamic Trade Finance Corporation (ITFC), The Islamic Corporation for Insurance of Investments and Export Credit (ICIEC) and The Islamic Corporation for the Development of the Private Sector (ICD).

Headquarters and Regional Offices

The Bank's headquarters is in Jeddah in the Kingdom of Saudi Arabia. Four regional offices were opened in Rabat, Morocco (1994), Kuala Lumpur, Malaysia (1994), Almaty, Kazakhstan (1997) and Dakar, Senegal (2008).

Financial Year

The Bank's financial year is the lunar Hijra year.

Accounting Unit

The accounting unit of the IDB is the Islamic Dinar (ID), which is equivalent to one SDR – Special Drawing Right of the International Monetary Fund.

Languages

The official language of the Bank is Arabic, but English and French are also used as working languages.