

The Islamic Finance Risk Initiative

RISK MANAGEMENT FOR ISLAMIC FINANCIAL INSTITUTIONS

A Collaborative Initiative of



AL-BARAKA BANK

BAHRAIN ISLAMIC BANK

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Preface

Richard Apostolik

GARP President & CEO

Islamic Finance has seen steady growth over the last five to seven years. Continued acceptance of Islamic Finance, and it making its way to becoming a part of mainstream finance globally will be dependent on building a solid understanding of the risks associated with the financial products and services it develops and offers to the marketplace. Working together, GARP and IRTI have taken the first step toward building this foundation of understanding through this book. Our intention was to, for the first time, clearly set out a standardized approach to identifying, assessing, measuring and dealing with the risks associated with Islamic financial products. Only with this understanding of how Islamic products and services work can the marketplace for them expand in a way that is open and transparent. Eliminating the uncertainty associated with understanding the risks surrounding these products by fully explaining how they work allows for a full and complete assessment of their uses, and allows for an evaluation of Islamic products and services in the same manner as the risks associated with conventional financial products. The marketplace will now have the ability to determine in an unambiguous and standardized manner how Islamic finance product and services may be used, and how to hedge exposures if necessary.

We would like to join with our partner, IRTI, in thanking all those Islamic practitioners, academics and scholars who were kind enough to work with us in developing this book. They brought to this endeavor the practical experience and knowledge that allowed us to present examples in this book based on practical approaches rather theory, making it immediately useful in the day-to-day activities of both Islamic and conventional financial services industry practitioners and regulators.

I would also like to especially thank and congratulate the co-chairs of the Islamic Finance Initiative, Dr. Hylmun Izhar and Dr. Ahmad Jachi, for their exceptional work and dedication over a lengthy period to bring this manual to fruition. It is always difficult to build something from scratch, especially something that has never been attempted before in a discipline that is complex and still emerging. They were able to successfully bring structure and remove uncertainty to what may be considered a still “new” area of global finance.

Additionally, I would also like to make note of the foresight shown by IRTI and the Islamic Development Bank in its support for this initiative. IRTI, as part of its mission, recognized the need for this book to be developed. It has also recognized that an initiative of this type does not end with this book. As with conventional finance, Islamic finance will change and evolve, and so will the need to regularly update and expand upon this initiative. IRTI is committed to be a leader in this regard and its continuing work in Islamic finance will help fuel the industry’s growth well into the future.

Professor Dr. Dato' M. Azmi Omar

Director General, Islamic Research and Training Institute (IRTI)

A Member of Islamic Development Bank Group

The importance of risk management for Islamic financial institutions can be hardly overemphasized. The Islamic Financial Services Board (IFSB) has taken the initiative to issue guidelines relating to risk management, stress testing and capital adequacy standards but detailed technical guidance is still needed that features the techniques and methodologies of risk assessment after taking into account unique risks of the Islamic Finance industry. In response to this, in early 2012 IRTI in collaboration with the Global Association of Risk Professionals (GARP) together embarked on this strategic project which is expected to offer benefits to the Islamic financial services industry.

The joint team began its work by carrying out a survey on the “State of Risk Management at Islamic Financial Institutions” and organized two consultative forums, in Jeddah (end of 2012) and Istanbul (September 2014). It is a source of immense pleasure for me to introduce to you the Phase 1 Report of the project which discusses practice driven risk management standards on Murabaha. The team will cover other Shari`ah financial contracts in future phases of the project.

I wish to extend my congratulations to the contributors and the editorial team on the completion of Phase 1 of the project. Needless to say, this document is a dynamic one and we encourage users and readers to share their views so that we can improve it in the years ahead.

Dr. Ahmad Jachi¹ and Dr. Hylmun Izhar²

Co-Chairs of The Islamic Finance Risk Initiative

One of the primary reasons for Islamic finance's slow integration is a lack of globally accepted standards providing a solid and sustainable foundation upon which it can build. Developing globally accepted approaches to identifying and measuring the risks presented by Islamic products will result in increased transparency and understanding of those products, leading to the adoption of best practices necessary to fuel further growth in Islamic finance. Currently, the differing approaches to Islamic product risk identification, measurement and assessment raises uncertainty about how these products and services are valued, priced and offered. The absence of a consensus around these issues will hamper Islamic finance's integration into the global economy and, as a result, its inclusion in discussions alongside conventional finance will remain questionable.

GARP and IRTI are therefore pleased to launch the Islamic Finance Risk Initiative, a partnership aimed at developing a series of practice-driven best practices and approaches designed to further the global Islamic finance industry's ability to identify, assess, measure, monitor and control the risks associated with Islamic financial products and services.

We believe the Islamic Finance Risk Initiative (IFRI) is both timely and a reminder that sound risk management is fundamental to good business management and will lead to a favorable business environment. IFRI came about because our respective esteemed institutions, GARP and IRTI, both passionately believe that there is a need for a document that sets out a practical framework for risk management, rather than one which perhaps is both academic and excessively quantitative in approach. We therefore did our best to present a document which can be easily understood by practitioners but still retains academic rigor.

We hope that the document will become the foundation upon which Islamic finance's future growth will depend. The benefits that risk mapping and analysis will bring are immeasurable as the results will directly and indirectly touch the lives of millions of individuals around the world. Both GARP and IRTI are dedicated to this important Risk Initiative, but we also believe that the involvement and contribution of prominent individuals and a select group of Islamic financial institutions, particularly those serving as the Oversight Committee of Experts, will ensure its success and acceptance.

¹ Dr. Jachi is the Chairman of Islamic Finance at Global Association of Risk Professionals

² Dr. Izhar is an economist at Islamic Research and Training Institute, a member of Islamic Development Bank Group

We also would like to extend our appreciation and gratitude to the prominent practitioners and scholars on the oversight committee of experts and the participants at the 2012 Jeddah Consultative Meeting and the 2014 Istanbul Industry Consultative Forum who have provided active insights, practical feedback, issue identification, and assurances that the practices enunciated by this project can be adopted and supported by the industry.

It is anticipated that our work will continue to ensure that the approaches and practices adopted here will remain current and responsive to industry advancements.

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We would like to acknowledge all institutions and individuals who have contributed in one way or another to the development of this document. Our gratitude goes to those who provided guidance, strategic direction and insightful comments that considerably helped sharpen the analysis and more importantly reflected the practice driven approach in the document. Special thanks are due to the following people and institutions (in alphabetical order):

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Background

In 2011, The Islamic Research and Training Institute (IRTI), a member of Islamic Development Bank Group, in collaboration with Global Association of Risk Professionals (GARP), embarked on the Islamic Finance Risk Initiative with the objective of developing practice-driven learning material for risk professionals in the Islamic Financial Services Industry.

In an attempt to identify the key areas that are shaping the practice of risk management within Islamic financial institutions, IRTI worked with GARP to conduct a survey and to organize a consultative meeting of industry practitioners. The objectives of these initiatives were to foster an exchange of ideas among Islamic finance experts, and to develop a consensus that would facilitate the identification of priority areas for study within the field of Islamic financial products and services. The consultative meeting, which was held in Jeddah, Saudi Arabia in December 2012, was attended by prominent regulators, practitioners and scholars.

The specific objectives of the survey were to (a) identify issues that are considered important to market players, regulators, Sharia scholars and academics; (b) identify risk management and measurement tools applicable for Islamic financial institutions which are in accordance with Sharia principles; and (c) serve as the basis for further policy and technical discussions with stakeholders of the Islamic Finance industry. The consultative meeting was designed to exchange ideas, develop a general consensus among Islamic finance experts and peers, and ultimately help in determining the priority areas in risk management for Islamic financial products and services.

The Jeddah consultative meeting was designed so that it focused on a specific set of questions identified in the survey which would help in identifying and prioritizing particular areas of concern and possible study. It became clear that the views and opinions expressed in the meeting were diverse, international in context and reflective. Moreover, the findings of the survey, combined with the views expressed in the consultative meeting, have greatly helped in shaping and determining the nature of the pilot project on which the Islamic Finance Risk Initiative is based. It was subsequently suggested to work initially on Murabaha, followed by other debt-like financing, namely Ijara, Salam and Istisna. The basis of this suggestion was that debt-like financing, particularly Murabaha, is widely used by Islamic financial institutions. As a result, there is an immediate need to understand its structure of risks, methods of risk assessment, and risk mitigation.

Upon the completion of risk management manual on Murabaha, IRTI and GARP organized an 'Industry Consultative Forum on Islamic Finance Risk Initiative' in Istanbul, Turkey on the 18th of September 2014. The event was hosted by Borsa Istanbul and the Centre for Applied Research in Finance of Bogazici University, Turkey. Senior Islamic financial practitioners, lawyers, academics and regulators from leading institutions and organizations from around the globe participated in this event. The forum envisaged two main objectives: (1) to introduce and deliberate on the Phase 1 study that analyses Islamic banks' practice-driven ways of identifying, assessing, and controlling risks of debt-like instruments with an emphasis on Murabaha; and (2) to discuss Phases 2 & 3 of the Risk Initiative which is expected to be completed in two years. Phase 2 of the Risk Initiative will deal with the risk analysis of debt like financing at the portfolio level and will also conduct a stand-alone risk assessment of sukuk, derivatives products and profit sharing financing such as Mudaraba and Musharaka. In Phase 3, the Risk Initiative will investigate enterprise risk management, displaced commercial risk and liquidity risk.

Insights from Jeddah Consultative Meeting and Istanbul Industry Consultative Forum

During the consultation sessions, it was evident that all the participants saw a need to have guidelines and technical notes which can be translated into practical and applied Islamic risk management. It was observed that risk professionals, in general, apply techniques used in conventional financial systems to Islamic finance. Hence, there has been a great deal of carry-over from conventional finance training to Islamic banking and finance. The need, therefore, is to crystalize the key issues of risk management and identify which methods can be or cannot be applied to Islamic banking. One suggestion was to give a priority to the clarification of accounting principles and their application to various Islamic modes of financing.

The Arab Accounting Organization for Islamic Financial Institutions (AAOIFI) has produced accounting and Sharia Standards but they are not yet adopted in many countries, and as a result different Islamic financial institutions are still using a variety of accounting practices. This creates confusion and is itself responsible for increasing risks in the Islamic finance industry.

The consultative session also deliberated upon the importance of various risks exposures in Islamic finance, such as credit risk, operational risk, market risk, and liquidity risk. It was recognised that all these risks share some common features with their conventional counterparts. Nonetheless, there are many distinct elements that apply to Islamic finance which should not be overlooked. For instance, credit risk in Murabahah, Istisna'a, and Ijarah which entail fixed obligation transactions have many commonalities with credit risk in conventional loan transactions. However, there are major differences in the philosophy, operative principles and ownership transmission between these Islamic modes of finance and conventional loans, resulting in different levels of credit risk and different types of credit risk.

Similarly, operations and procedures for similar instruments differ across Islamic banks. The procedural differences are also factors in the emanation of credit risk and operational risk. It was therefore agreed to select one financial instrument at a time and map all kinds of risks associated with that instrument; and to devise ways to measure and mitigate those risks, according to the instrument category.

There are several advantages in taking an instrument-by-instrument approach rather than a product-by-product approach. First, each Islamic finance instrument has its own specific features (like having its own DNA) and so many bank/brand specific products can be analysed under more general instrument specific characteristics. Second, issues of an asset's ownership, its risk transmission and operational requirements which impact risks have common features within an instrument category (within Murabahah, for instance). Third, this approach will enable the coverage and analysis of all financial risks embedded in one Islamic financial instrument as those risks transform from one type to another during the instrument's life. Fourth, such an approach will provide a more complete guide to financial institutions and practitioners for at least one type of instrument that they can apply immediately.

Operational risk was identified by many experts as an important risk category and one that should be considered before liquidity risk (though after credit risk). A key aspect of Islamic finance is that ownership risk cannot be avoided: this is an integral and unavoidable feature of Islamic banking. Therefore, operational risk in Islamic finance is not simply of a set of procedures, documents and I.T. functions. Rather, it raises questions of how mechanisms can be established to mitigate the risks of Sharia non-compliance.

Another observation made during the consultative session was that many Islamic financial institutions lack the ability to manage risks internally – a factor that in itself increases risk levels within individual institutions and the industry as a whole.

The discussion during the consultative session also considered the implications of Basel III for Islamic financial institutions and their risk management practices. The Liquidity Coverage Ratio and Net Stable Funding Ratio were particular areas of focus. Participants thought that while the new Basel requirements will increase costs of compliance, they will also provide an opportunity for Islamic financial institutions to assert at the international level that their business model is stronger and more stable than those of conventional banks. It was noted that some central banks have already started preparing for quantitative impact assessments of Basel III on their banking systems.

Another vital issue is how to build a legal and regulatory framework for risk management in Islamic financial institutions. Take as an example credit risk arising from Murabaha. A dispute, in the event of default, in which the beneficiary has the resources to pay on time but remains unwilling to do so can be exacerbated by the fact that legal proceedings might take a long time. It was also pointed out that there have been cases whereby in order to avoid payments and penalties one party has claimed that the original financing contract was Sharia non-compliant and that consequently no payments were due to the bank.

Such issues highlight the need to harmonize legal frameworks in order to increase the efficiency with which such cases can be solved. Another legal/regulatory issue which was singled out relates to Murabaha transactions. Since such transactions are trade related, they are not registered with credit information bureaus in many jurisdictions. As a result, proper credit rating information about the debtor (and sometimes also of the creditor) is not available. These problems demonstrate the need for business rating bureaus in all jurisdictions where Islamic financial institutions are active, as well as rules requiring Murabaha transactions to be registered with such bureaus.

The consultative meeting also noted that Islamic finance has not kept pace with advances in risk mapping, measurement, and management techniques during last 10 to 15 years, due to lack of basic data. The current format of data reporting is such that Islamic finance cannot be identified in the balance sheet of conventional banks that operate Islamic windows (as opposed to being wholly Islamic banks).

It was also emphasised that since Islamic finance transactions are essentially real trade transaction and investments, and are not pure financing transactions, they have to be treated, mapped, and measured differently. An exercise to map and measure risks of each major mode or instrument of Islamic finance would not only help to raise the profile of the issue at an institutional level but it will also draw the attention of regulators and governments who need to develop adequate basic infrastructures for Islamic

finance. More importantly, such an exercise would help to link actual practice to the standards on risk management and accounting and the Sharia principles produced by the IFSB and AAOIFI.

Many participants at the consultative meeting believed that there is a great need to operationalize the IFSB and AAOIFI standards, and to produce practical and technical guidance on how to implement them. A project on risk mapping could help to create guidance notes and understanding in the area of risk related standards.

In light of the survey findings and the discussion held in the earlier session, it was decided in the last session of consultative meeting that a pilot project on risk mapping, measurement and mitigation for Murabaha would be started.

It was pointed out that financial institutions are currently using Murabaha for three purposes:

- (i) Financing clients based on Murabaha
- (ii) Funding financial institutions' own operations based on Murabaha funding deals.
- (iii) Liquidity management of financial institutions based on Murabaha transactions.

Type (ii) and (iii) are mostly based on commodity Murabahah or reverse Murabahah, neither of which is part of the pilot project. Only type (i), financing Murabaha, would be evaluated. Risk implications of type (i) financing murabahah depend on a variety of factors, such as:

- whether Murabahah is collateralized or non-collateralized;
- whether it is promise based or not promise based;
- the nature of underlying commodity or item;
- whether the finance operation is funded by un-restricted investment accounts, restricted investment accounts or from demand deposits.

In summary, the participants all supported the initiative and effort by IRTI and GARP to start a pilot project on Murabaha instruments risk mapping, measurement and mitigation with a possibility of expanding the initiative to other instruments once the pilot project is completed.

Capturing Stakeholders' Views on Various Risk Management Issues: Lessons from IRTI-GARP Survey

World financial markets continue to examine the fundamental pillars of global and domestic financial institutions in the wake of continuing changes in the international economic and political environment. In contrast, Islamic financial institutions (IFIs) are demonstrating resilience as international events continue to reshape the landscape of global financial services. The test for the Islamic finance services industry (IFSI) will be how it prepares itself for the opportunities and challenges thrown up by the rapidly changing global economy.

The Banker, in its special issue on ‘Top Islamic Financial Institutions’,³ reported that the IF industry had shown rising assets in all of the seven years since it began collecting data in 2006. It climbed from USD 1,166 billion in 2012 to USD 1,267 billion in 2013, representing year-on-year growth of 8.67%. The Banker also noted that while the growth of the industry in 2013 had slowed from the 20.7% seen in 2012, the compound annual growth rate since 2006 still remained healthy at 16.02%.

One of the very crucial fields yet to be developed is risk management, which requires more detailed technical guidance, and applied and policy oriented research featuring techniques and methodologies of risk assessment that take into account the unique risks faced by IFIs.

In an attempt to identify and prioritise areas of concern for the development of a risk management framework for Islamic financial institutions, IRTI conducted a survey in collaboration with Global Association of Risk Professionals (GARP). The survey, which obtained 38% response rate, involved central banks, important market players, prominent researchers, leading Shariah scholars and standard setting bodies had the following primary objectives: (a) to identify issues that are considered important to market players, regulators, Shariah scholars and academics; (b) to identify risk management and measurement tools applicable to Islamic financial institutions which are in accordance with Shariah principles; and (c) to serve as the basis for further policy and technical discussions with stakeholders of the IF industry. The survey covered the regions of Asia, Middle East, and the West (U.K. and U.S.). The questions were formulated to capture the respondents' preferences on the specific subject and therefore there was only one answer to each question.⁴

The results of the survey are expected to help in identifying the key areas of concern for the Islamic Finance industry and to help in formulating the acceptable methodology for risk management tools

³ November 2013

⁴ The respondents' preference was captured by the following options:

- | | | |
|---|-------------------|--|
| 1 | Strongly agree | - Showing an absolute preference towards the statement |
| 2 | Agree | - Showing major tendency towards the statement |
| 3 | Tend to agree | - Showing minor tendency towards the statement |
| 4 | Tend to disagree | - Showing minor tendency against the statement |
| 5 | Disagree | - Showing major tendency against the statement |
| 6 | Strongly disagree | - Showing an absolute preference against the statement |

including risk assessment techniques for IFIs. As such, the survey covers the following areas (a) general issues in risk management, (b) risk classification, (c) governance issues, (d) Shariah issues in risk management, (e) regulatory and supervisory framework, and (f) macro and financial stability.

Survey Findings

On the general issues, although there was a general consensus on the need for a conceptual alignment between risk management principles and Shariah requirements, the importance of focusing on the development of acceptable instruments and mechanisms for risk mitigation was stressed by many participants.

On the aspect of ‘risk classification’, the survey suggests that there are not many differences between the definition of risks by Islamic Financial Institutions and their conventional counterparts. However, the nature and sources of risk can be substantially different due to various Shariah restrictions. Therefore, a modification in the identification, measurement and mitigation methods may be required. The survey shows that the most dominant risk in IFIs is credit risk (please see figure 1)⁵. More importantly, it also shows that there was a common perception about the need to prioritise the development credit risk management in IFIs (please see figure 2).

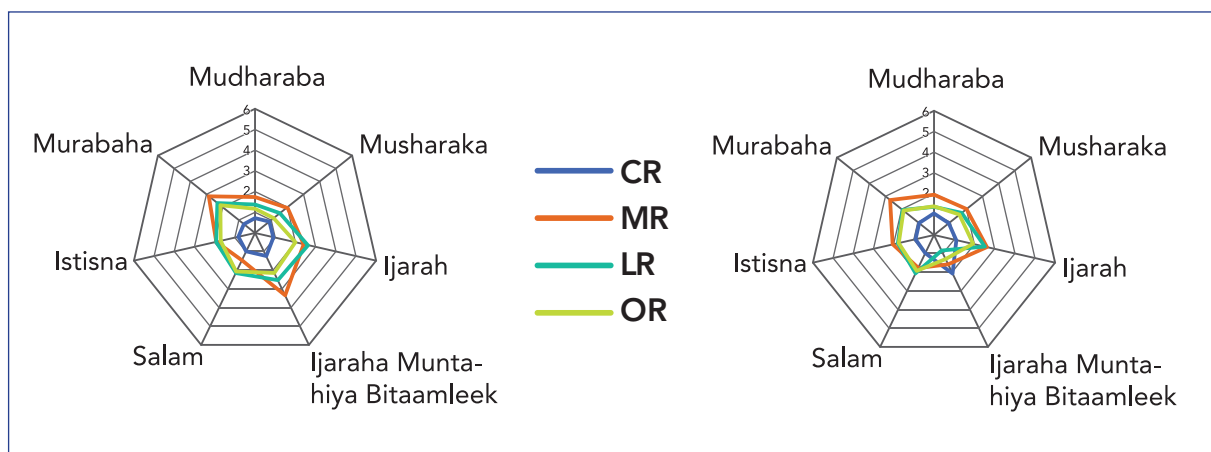


Figure 1

What is the most dominant risk in IFIs?

Figure 2

In which area of risk should the development of Islamic risk management be prioritised?

When discussing the issue of governance and risk control systems for IFIs, the responses were indicated that there is widespread adoption of conventional corporate governance practices.

On the subject of ‘Shariah issues in risk management’, the respondents were unanimously of the view that the incorporation of Shariah principles into risk management techniques is needed. However, interesting results appeared when responses were disaggregated according to regions and the type of respondent. For example:

⁵ The most inner part of the web in the figure corresponds to the highest value.

1. There was, surprisingly, a common perception about Shariah issues in risk management between Asia and GCC.
2. There was a reservation towards the use of *hiyal*⁶ and the practice of some contentious products, such as *tawarruq*⁷ and some derivatives products.

The two results mentioned above are not generally in line with the widely held belief that differences exist in the implementation of some Islamic products as a result of differing schools of thought in Asia and the GCC.

The result shows that there was a large divergence in understanding the principle of ‘ownership is associated with risk’ (*al kharaj bi ad-dhaman*) which strongly indicates that more awareness programs need to be conducted to clarify and enhance the way in which this core principle is understood.

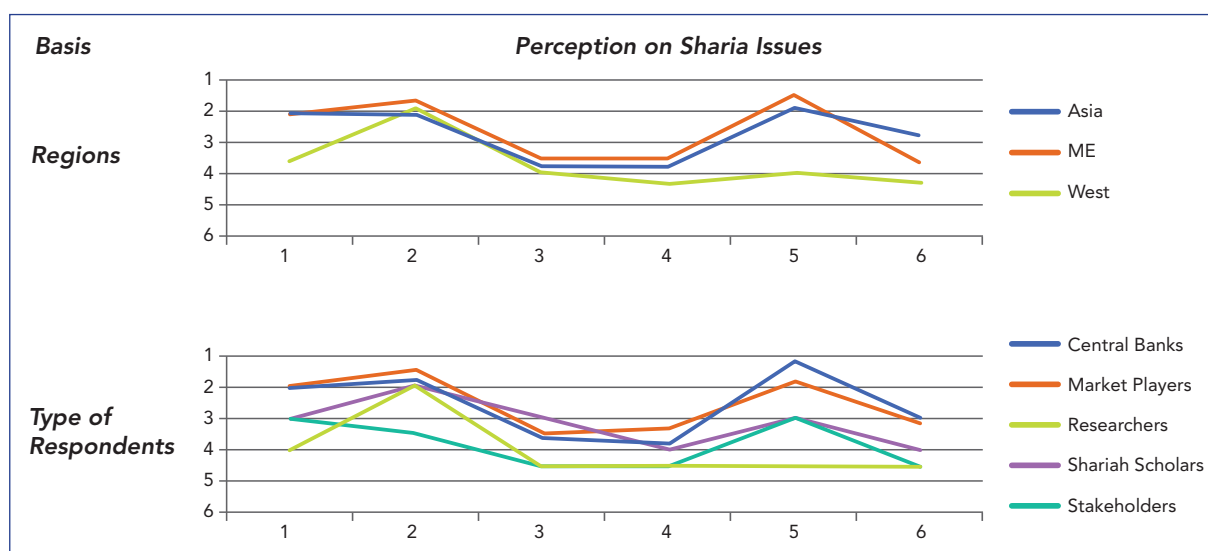


Figure 3

The six questions raised in ‘Shariah issues in risk management’ are as follows:

1. Some of the Shariah principles have been adopted in the existing risk management concept
2. Shariah principles need to be well translated into technicalities in the area of risk management
3. The principle of ‘aversion of damages and generation of utilities’ (*dara’ al-mafasid wa jalb al-masalih*) justifies the application of *tawarruq*, *wa’ad* based forex option, and profit rate swap
4. The use of legal exceptions (*makharij*) and legal stratagems (*hiyal*) in structuring derivatives products is necessary since the Islamic financial industry works within conventional system
5. Ownership cannot be divorced from risk as it is against the principle of *al kharaj bi ad-dhaman*
6. Double *wa’ad* short selling is permissible, provided that it is not misused.

⁶ *Hiyal* (sing. *hila*) are essentially “legal devices” or tools used to achieve a certain objective.

⁷ *Tawarruq* is a transaction where one party buys some goods on credit at a marked-up price and sells the same at a lesser value for the purpose of getting cash (i.e. the spot value of the goods). The purpose of this transaction is not the possession of the goods, but the obtaining of liquidity.

In the last two sections of the survey, the respondents were asked about some aspects of the regulatory/supervisory framework and macro and financial stability. In response, they stressed the need to develop an Islamic risk management framework and emphasised the importance of having data compatibility for macro prudential purposes.

In conclusion, it is worth stating that there is a common perception about the need to prioritise the development of credit risk management in IFIs. Furthermore, it was also commonly understood that whilst the definition of risks in IFIs is not substantially different from the ones faced by their conventional counterparts, a modification in the identification, measurement and mitigation of risks may be required due to some Shariah principles. More importantly, it was also indicated in the survey results that a proper legal environment and suitable regulatory framework needs to be developed to support the sound practice of risk management in IFIs.

Introduction to Islamic Finance

Islamic economics and finance are an integral part of the Islamic system of beliefs whose aim is to establish a just and moral social order. As a result, they cannot be examined in isolation from the social, political and cultural structures that constitute the other elements of the Islamic system or its conceptual framework. For example, by prohibiting 'riba', the Sharia (Islamic law) sets a governing relationship between the providers of funds and the users of funds based on the sharing of profits and risks to ensure an efficient and equitable allocation of resources to their most productive use. Similarly, by imposing *Zakat*, Islam requires the rich to help the needy with the intent of alleviating poverty.

Two core Sharia principles that govern financial and commercial contracting are the prohibition of *riba* and the prohibition of *gharar*.⁸

1.1 Riba, Usury and Interest

Historically, the practice of charging interest on loans was strongly condemned in Judaism, Christianity and Islam on both moral and religious grounds. For example, in the Old Testament of the Bible, denunciation of usury is revealed in the following passage:

"Take thou no usury of him, or increase: but fear thy God: that thy brother may live with thee." [Leviticus 25:36]

Likewise, within the Catholic Church, the Third Lateran Council of 1179 decreed the excommunication of those who engage in usury (Canon 25). Usury at that time was defined as *any rate of interest charged on loan*.

It was only in the fifteenth and sixteenth centuries that, within the Christian world, usury took on a new and current meaning of exorbitant or unlawful interest rates. For example, in England, a series of laws on usury during the sixteenth century created clear distinctions between what was considered an exploitative rate of interest and an acceptable one.

In contrast, within Islam, *Riba* has not only maintained a definition that designates all types of interest on money as exploitative and therefore unacceptable, but it extends beyond money to include a prohibition on transactions that include commodities such as gold and silver.

Islam's prohibition of *riba* is rooted in several verses of the Qur'an in which the charging of interest is strongly denounced:

"Those who devour usury will not stand except as stand one whom the Evil one by his touch Hath driven to madness. That is because they say: 'Trade is like usury', but God hath permitted trade and forbidden usury. Those who after receiving direction from their Lord, desist, shall be pardoned for the past: their

⁸ Sharia imposes additional restrictions including the prohibition of gambling, hoarding, and trading *haram* goods such as alcoholic beverages and pork.

case is for God (to judge); but those who repeat (The offense) are companions of the Fire: They will abide therein (forever)." [2:275]

"God will deprive usury of all blessing, but will give increase for deeds of charity: For He loveth not creatures ungrateful and wicked." [2:276]

"O ye who believe! Fear God, and give up what remains of your demand for usury, if ye are indeed believers." [2:278]

"If ye do it not, take notice of war from God and His Messenger: But if ye turn back, ye shall have your capital sums: Deal not unjustly, and ye shall not be dealt with unjustly." [2:279]

The Qur'an stresses that charging interest on loans is a great sin because of the injustice it inflicts on society.

There are two types of Riba: (1) *riba al-qurud*, the interest rate charged on loans and (2) *riba al-buyu'* that arises from specific exchanges.

1.1.1 Riba al-qurud

The Sharia prohibits the charging of interest on loans. Accordingly, all financial instruments that provide credit and pay a pre-determined rate of interest (for example, bonds and commercial paper) are not permissible.⁹ Moreover, the Sharia prohibits the charging of interest or fees for extending the maturity of a loan or for late payments.

The following case, which was reported in the Wall Street Journal, is an example of *riba al-qurud*. Under the Sharia, this type of increase in debt resulting from deferring payments is prohibited.

"When Michelle Biscutti, a 41-year-old family practitioner in Columbus, Ohio, finished medical school in 2003, her student-loan debt amounted to roughly \$250,000. Since then, it has ballooned to \$555,000. It is the result of her deferring loan payments while she completed her residency, default charges and relentlessly compounding interest rates. Among the charges: a single \$53,870 fee for when her loan was turned over to a collection agency." (Mary Pilon, *The Wall Street Journal*, Tuesday, February 16, 2010)¹⁰

1.1.2 Riba al-buyu'

Riba al-buyu' is based on a Hadith (a saying) by the Prophet Muhammad (peace be upon him) related to the exchange of six specific commodities, namely gold, silver, wheat, barley, dates and salt.¹¹

⁹ Only free-interest loans or Qard Hassan are permissible. This type of loans is given to those in need to help them.

¹⁰ Albert Einstein referred to compound interest as the greatest force in the universe. When interest rates were soaring in the 1980s, the television host and comedian Johnny Carson joked on the Tonight Show that "Scientists have developed a powerful new weapon that destroys people but leaves buildings standing – it's called the 17% interest rate."

¹¹ Hadith is the collection of sayings of the Prophet Muhammad (pbuh).

1. Introduction to Islamic Finance

“Gold for gold, silver for silver, wheat for wheat, barley for barley, dates for dates, salt for salt, like for like, equal for equal, and hand-to-hand; if the commodities differ, then you may sell as you wish, provided that the exchange is hand-to-hand or spot transaction.”

Islamic Jurists divide the six commodities into two groups: Money (gold and silver) and Food (wheat, barley, date, and salt).¹²

These exchanges are classified into three categories:

- (1) the exchange of commodities of the same genus;
- (2) the exchange of commodities belonging to the same group but of different genus; and
- (3) the exchange of commodities belonging to different groups. Within each category, two criteria are examined to determine whether a trade is prohibited or permissible: quantities traded and delivery date.

Riba al-buyu' arises whenever commodities of the same genus are traded in different quantities (*riba al-fadl*) or when the delivery of one of the commodities traded within the same group is deferred (*riba al-nasa'*).¹³

		Money		Food			
		Gold	Silver	Wheat	Barley	Dates	Salt
Money	Gold						
	Silver						
Food	Wheat						
	Barley						
	Dates						
	Salt						

Source: Al Jami' fi Usul Al-Riba, Rafiq Yunis, 1991

	Equal Quantities		Different Quantities		Different Quantities
	No Credit		No Credit		Credit

Figure 1.1 Exchange of Six Riba Commodities

Exchange of commodities of the same genus: A transaction is deemed *riba* and thus prohibited if commodities of the same genus are traded in different quantities (*riba al-fadl*) or if the delivery of one of the commodities is deferred to a future date (*riba al-nasa'*). For example, it is prohibited to exchange one kilogram of Canadian wheat on the spot for two kilograms of American wheat (*riba al-fadl*), or to buy today one kilogram of Canadian wheat for one kilogram of American wheat to be delivered in the

¹² Gold and silver were the monies used during the time of the Prophet (pbuh)

¹³ *Riba al-buyu'* comprises *riba al-fadl* and *riba al-nasa'*. *Riba' al-fadl* relates to increases in quantities and *riba al-nasa'* to deferred delivery.

future (*riba al-nasa*). For an exchange to be valid, commodities of the same genus must be traded in equal quantities **and** “hand-to-hand.”

Exchange of commodities of the same category: For a transaction to be valid, commodities of different genera should be traded *on the spot* whether in equal or different quantities. Any transaction on credit, even in equal quantities, is deemed *riba (riba al-nasa)*. For example, it is prohibited to exchange one ounce of gold today for one ounce of silver to be delivered in the future but it is permissible to buy one ounce of gold for two ounces of silver on the spot.

Exchange of commodities in different categories: When commodities belong to different groups, people are free to exchange different quantities on the spot or on credit. There are four possible ways to trade commodities for gold or silver of which only three are permissible:

- Spot exchange of both money and commodity;
- The price is paid in advance but the delivery of the commodity is deferred to a future date (this is known as a ‘salam’ sale);¹⁴
- The commodity is delivered today but payment is deferred to a future date;
- Both the commodity and payment are deferred to a future date. This debt-for-debt type of sale is prohibited by Sharia.

1.1.3 Exchange of Paper Money

These rules governing the exchange of gold and silver restrict trade to spot transactions. Thus, the trade of one ounce of gold for 60 ounces of silver can only be “hand-to-hand.” The deferment of delivery of one of the commodities invalidates the transaction, and is deemed *riba*. Accordingly, a question arises as to whether currencies should adhere to the same set of rules governing the six *riba* commodities?¹⁵ For example, can a \$100 bill be exchanged today for \$110 to be delivered in a year time? Or can EUR100 be traded in a cash transaction for \$130?

The Fiqh Academy of the Organization of Islamic Cooperation (Resolution 21, 1986) made the following decision pertaining to Sharia rules governing paper money:¹⁶

“A paper money is real money, possessing all characteristics of value, and subject to Sharia rules governing gold and silver vis-à-vis usury, Zakat, Salam and all other transactions.”

The implications of the Fiqh Academy’s resolution on currency exchange (*sarf*) can be summarized as follows:

- Currencies can be exchanged at different rates in a cash transaction but a single currency cannot be traded in different quantities. For instance, EUR100 can be traded for \$130 hand-to-hand, but \$100 cannot be exchanged for \$110.

¹⁴ Salam sale is a forward type of sale that will be discussed in chapter two.

¹⁵ The six *riba* commodities are the ones mentioned above: gold, silver, wheat, barley, date, and salt.

¹⁶ The Organization of Islamic Cooperation (formerly known as the Organization of the Islamic Conference) was founded in 1969 and acts as the collective voice of the Muslim world. Its membership comprises 57 states.

1. Introduction to Islamic Finance

- Currency exchange cannot be carried out on credit.¹⁷ Thus, one cannot buy EUR100 spot for \$130 forward. Similarly, one cannot buy \$100 spot for \$110 forward.

By prohibiting the exchange of commodities of the same group on credit, the Sharia prevents lenders from circumventing the prohibition of charging interest on loans. Consider the following example, where someone wants to sell a foreign currency today at a premium in return for future payment in local currency. If the market exchange rate for euros is EUR1=USD1.30, the lender can earn a return of \$10,000 by “selling” the borrower EUR100,000 at the premium rate of EUR1=\$1.4 in exchange for \$140,000 to be paid back in one year. The borrower, who is in need of the dollar funds today would exchange the EUR100,000 at today’s prevailing market rate in return for \$130,000. Hence, the borrower receives \$130,000 today in return for paying back \$140,000 in one year! This type of transaction was prohibited by the Fiqh Academy’s resolution on currency exchange as currency transactions of this nature are considered commodity transactions carried out on credit.¹⁸

1.2 Gharar

The Sharia prohibits all forms of gharar sale and considers gharar contracts null and void. Gharar arises when a transaction comprises specific elements of risks or uncertainty and incompleteness. For example:

- **Lack of information about the subject matter or its attributes:** Selling a car without specifying the car make, the year, or any other features.
- **Uncertainty about the existence of the subject matter:** Selling the fruit before it is formed on the tree.
- **Uncertainty towards possession/ownership of the subject matter:** Short selling, where the seller is selling what he does not own. The exceptions to this rule are the Salam and Istisnaa contracts.¹⁹
- **Uncertainty of the price:** The buyer offers to pay next year’s market price – which is not known at the time of the contract.
- **Uncertainty about the term of payments:** Deferring payment to some unspecified future date.
- **Making a sale conditional on an unknown event:** The buyer of the house tells the seller that he will pay him as soon as he sells his old house.

A case that might include all the aforementioned elements of gharar is one where a fisherman offers to sell tomorrow’s catch and the buyer offers to pay him tomorrow’s market price if the catch includes shrimp. In this case, both the fisherman and the buyer cannot determine beforehand the type of fish that will be caught, the quantities or the value of the catch (or even whether any fish will be caught at all). If the buyer agrees to pay the seller a predetermined price for the catch of unknown value at the time of contracting, the transaction will be characterized as speculation and under such circumstances, the transaction is deemed null and void under the Sharia.

¹⁷ Currencies belong to the same category as gold and silver

¹⁸ The inclusion of a currency exchange element in the bill of exchange in Medieval Europe enabled lenders to circumvent the Church’s prohibition of usury.

¹⁹ Both Salam (forward type of sale) and Istisna (commission to produce) will be discussed in detail in Chapter 2.

By prohibiting all forms of gharar, the Sharia ensures fairness in commercial and financial contracting.²⁰ As a result, most derivative contracts are considered invalid because of the uncertainty involved in the future delivery of the underlying asset. In a forward contract, both the asset and the price are delivered in the future and in an option contract, money is exchanged for the ‘right’ to buy the asset not the asset itself.

One of the implications of the prohibition of gharar is the prohibition of pure speculation and gambling activities.

1.3 Time Value of Money

In 1748, Benjamin Franklin wrote: “Advice to a Young Tradesman, Written by an Old One: Remember that time is money.” Rational, risk-averse individuals factor the price of time and the price of risk into their investments decisions. They try to determine the value of uncertain cash flows at different points in time. For example, they ask what a future uncertain cash flow is worth today, or what a present cash flow will be worth at some future date. Accordingly, they require a rate of return that will compensate them for the opportunity cost of funds (price of time) and for bearing the risk of investing (the price of risk). The higher the opportunity cost and/or the risks involved, the higher the rate of return required.

By prohibiting the charging of interest on loans, even when the rate is equal to the expected inflation rate, the Sharia denies savers the right to be compensated for the time value of money. However this does not necessarily imply that Sharia does not recognize the time value of money. If time has no economic value than there would be no need to evaluate different investment opportunities (assuming they have the same risks). It would be sufficient simply to sum the future cash flows and choose the ones that generated the most cash. Thus, in the following example, if investors do not account for the time value of money, they should be indifferent between projects A and B; they should prefer both C and D over A and B; and they should prefer C to D.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year10
A	\$1,000									
B					\$1,000					
C								\$450	\$350	\$350
D	\$-5,000								\$3,100	\$3,000

To consider the Sharia approach to the time value of money, let us first review Sharia rulings related to transactions involving riba:

- It is prohibited to charge interest on loans;
- It is prohibited to charge interest or fees for late payment;
- Different commodities of the same group can be exchanged in different quantities on the spot but cannot be traded on credit even if quantities are equal;

²⁰ Note that the concept of “fairness” does not imply the elimination of risk per se. For example, Sharia-compliant contracts such as mudaraba and musharaka include elements of risk sharing. (See below)

1. Introduction to Islamic Finance

- A single commodity cannot be exchanged in different quantities whether on the spot or on credit;
- A commodity can be exchanged for a higher deferred price (this is known as a 'nasi'a' sale);
- A commodity can be delivered at a future date in exchange of a lower immediate payment (salam).

The most important distinction that arises from these classifications of *riba* is that between lending and investing. Time has value, but only when it is associated with real economic activities. Accordingly, the Sharia recognizes time value in credit sales but denies any compensation for time in loans even to account for the diminishing purchasing power of money.²¹ Critics have argued that there is no difference between charging a premium on credit sale and charging interest on a loan. For instance, selling an asset for \$1,050 paid in six months is the same as selling it for \$1,000 paid in three months after which the buyer asks to extend the maturity for another three months in return for \$50.²² This comparison was strongly denounced by the Qur'an:

"Those who devour usury will not stand except as stand one whom the Evil one by his touch Hath driven to madness. That is because they say: 'Trade is like usury', but God hath permitted trade and forbidden usury. Those who after receiving direction from their Lord, desist, shall be pardoned for the past: their case is for God (to judge); but those who repeat (The offense) are companions of the Fire: They will abide therein (forever)." [2:275]

By prohibiting the charging of interest on loans while allowing credit sale premiums at the initiation of the transaction, the Sharia marginalizes the role that lending and borrowing plays in the financial system.

1.4 Sale of Debt

The validity of a debt sale depends on the type of buyer and the method of payment. Sharia scholars differentiate between selling the debt back to the debtor or to a third party, and between selling it for cash or on credit. This leaves us with four possibilities to examine:²³

	Debtor	Third Party
Cash	Sale of debt to debtor in return for cash	Sale of debt to third party for cash
Credit	Sale of debt to debtor on credit	Sale of debt to third party on credit

Sale of debt to debtor in return for cash: The exchange of debt for cash can take one of two forms:

- (1) prepaying the debt, or
- (2) redeeming the debt at maturity.

21 The increase in price in credit sale cannot be solely justified by the time value of money. There are other factors that make the seller ask for a premium and for the buyer to be willing to pay the premium.

22 There is a difference between increasing the price before the contract is concluded and after it. Asking for a higher price in return for a longer maturity is permissible. However, asking for a premium for extending the maturity of the debt – payment owed – is *riba*.

23 Although Sharia scholars examine eight different cases of sale of debt, only four are relevant to our analysis.

Both types of exchanges are valid but the exchange of a salam obligation for cash must be carried out at a price equal to or lower than the original selling price to avoid riba (Section 2.2 describes Salam financing in detail). Consider a bank that pays USD 62,800 to purchase 10,000 bushels of corn to be delivered three months from now. The bank cannot sell back the corn to the obligor for USD 64,000 before taking possession. Otherwise, the two transactions will be replicating an interest-bearing loan. The bank can, however, sell back the undelivered corn prior to the maturity of the salam contract, say in two months, in return for USD 62,800 or less.

Sale of debt to debtor on credit: The sale of debt to the debtor on credit is merely an extension of the maturity of the debt. This exchange of a delayed obligation for another delayed obligation (bay'ul kali' bil kali') was prohibited by the Prophet (pbuh).

Sale of debt to third parties for cash: Lenders in need of liquidity usually sell debt obligations to third parties at a discount. This type of exchange is prohibited on the ground of riba and gharar. The buyer of the debt exchanges a smaller quantity of dollars today for a larger quantity at maturity, which leads to riba. In addition to riba, the sale of debt to a third party has an element of gharar since the lender is selling what he does not possess and the buyer is uncertain whether the borrower will pay back the debt at maturity. Securitization of debt falls under this category.

Sale of debt to third parties on credit: This is another form of an exchange of a delayed obligation for another delayed obligation (bay'ul kali' bil kali') that has been prohibited by the Sharia.

It should be noted that in Malaysia some religious rulings exist that permit the sale of debt. However, sale of debt is very limited outside Malaysia and such transactions remain controversial within the Islamic finance community.

Structure Mapping of Debt-like Transactions

2.1 Murabaha Financing

2.1.1 Classic Murabaha

A classic marabaha is a *sale contract* by which the owner of an asset or good sells it to a buyer at cost plus markup.²⁴ Both the cost and the profit margin should be disclosed. The markup may be a lump sum or a percentage of the cost. The sale can be on a cash basis or deferred payment basis. In a credit sale, the agreed price could be paid in the form of a series of future payments or as a lump sum payment at a specified future date. In either case, the seller is free to link the size of profit to the time at which payments are due. For instance, the seller may ask for a higher markup if payments are to be made in the longer term.

Illustration 2.1 Classic Murabaha

Abdullah, who works as a lawyer in Paris, wants to sell his apartment and move to New York to join an International law firm. He is asking for EUR 500,000 for the apartment – to be paid in cash. Jaafar, a doctor and a friend of Abdullah, works at a nearby hospital. Jaafar is planning to get married to Fatima, his colleague at the hospital, and is searching to buy an apartment that is close to the hospital he works at. Jaafar, a pious Muslim, refuses to seek an interest-bearing loan to finance the purchase of the apartment. He approached Abdullah and asked him whether he would sell him the apartment on a 10-year deferred payment basis. Abdullah informed Jaafar that he bought the apartment five years ago for the price of EUR 400,000 and that he is willing to sell it for a profit margin of EUR 200,000 under the following conditions: EUR 100,000 upon signing the contract and transferring the ownership to Jaafar, EUR 50,000 per year for the next ten years or a total price of EUR 600,000. Jaafar agreed to the terms and they both entered into a murabaha agreement.

2.1.2 Musawama

Musawama is a sale transaction similar to a murabaha except that the seller does not disclose the cost of the object of sale, only the price at which he is willing to sell. Usually when the seller wants to enter into a murabaha contract but cannot determine the exact cost of the asset, musawama becomes his only recourse.

²⁴ The cost includes all the expenses incurred in acquiring the asset such as transportation cost, custom duty, etc.

Illustration 2.2: Musawama

Amr, who lives in the U.S. and is a fan of big screen TVs, waited for Black Friday to buy a 50-inch TV and a Blue Ray DVD player at the bargain bundle price of \$700. Since Amr has already a DVD player, he decides to sell it. But he does not know the cost of the DVD player because he purchased both the TV and the DVD player as a bundle. In this case, Amr would enter into a musawama contract to sell the DVD player.

2.1.3 Murabaha to the Purchase Orderer (MPO)

Murabaha to the Purchase Orderer (MPO) is a modern version of the classic murabaha structure that provides a Sharia compliant alternative to interest-bearing loans for the purpose of financing the acquisition of assets and for international trade. It involves three parties: the Islamic bank, the customer and the supplier. The MOP structure involves the following steps:

1. The customer approaches the bank to finance the purchase of an asset. He provides the bank with the asset specifications and negotiates the price (cost-plus) to be paid to the bank and the terms of financing;
2. After agreeing on the terms with the bank, the customer signs a Promise Agreement, in which he promises to buy the asset once the bank acquires it from the supplier;
3. Pursuant to the Promise Agreement, the Islamic bank purchases the asset from the supplier who transfers ownership of the asset to the bank. The bank can either buy the asset directly (as principal) or appoint the customer to buy it on his behalf (as his agent);
4. Once the asset is in the possession of the bank - whether actual or constructive possession - the bank resells it to the customer under a Murabaha Agreement;²⁵
5. The bank transfers the ownership of the asset and delivers the asset to the customer who starts making installment payments to the bank over the agreed financing period.

²⁵ Constructive possession is a legal term used to describe situations where the person has actual physical custody of the asset. For example, a person's valuables in a safety deposit box at the bank are under his constructive possession but not under his actual physical possession.

2. Structure Mapping of Debt-like Transactions

Illustration 2.3 Murabaha to the Purchase Orderer

Abu al-Qasim Hospital approaches an Islamic bank to finance the purchase of the newest high resolution imaging CT scanner available in the market. The scanner costs USD 3 million and the hospital plans to get five-year financing in order to buy it. The bank asks for a mark up of USD 500,000 to finance the deal. The hospital agrees and signs a Promise Agreement committing itself to buy back the CT scanner from the bank. The bank then appoints the hospital as its agent and asks it to acquire the scanner on the bank's behalf and take delivery of the scanner. Once the deal is concluded with the supplier and the bank has taken constructive possession of the scanner, the bank resells it to the hospital at the price of USD 3.5 million to be paid over a period of five years.

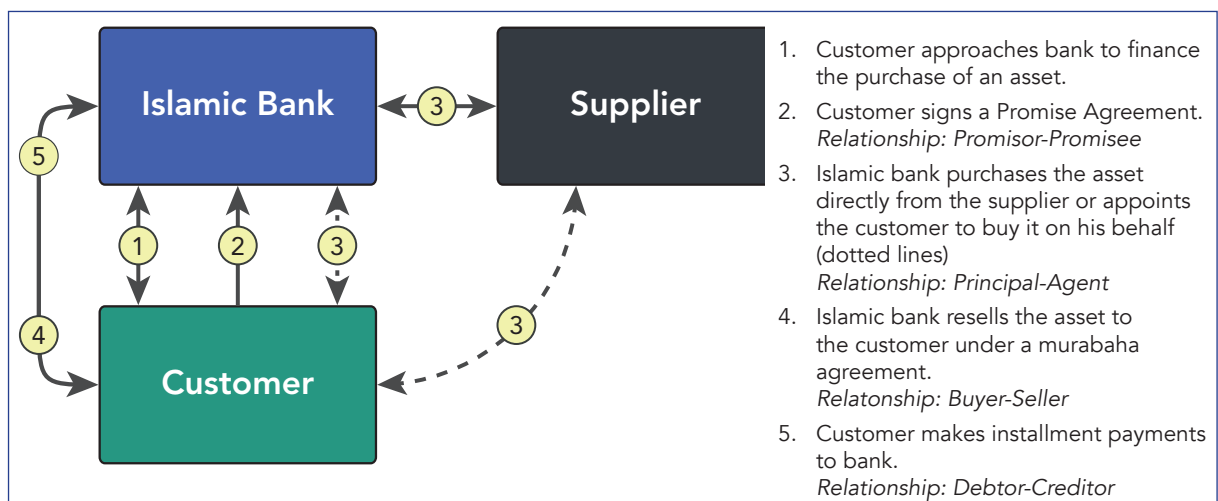


Figure 2.1 Murabaha to the Purchase Orderer

2.1.3.1 Validity of an MPO Contract

For an MPO to be Sharia compliant, it must adhere to the following rules that govern a murabaha transaction:

1. **Existence of the goods at the time of sale:** Goods that are not in existence at the time of sale cannot be sold. For example, one cannot sell an Apple iPad before it becomes available on the market.
2. **Ownership of goods at time of sale:** The bank cannot sell goods that it does not own. The bank must first purchase the goods and then resell them to the customer.
3. **Possession of goods at time of sale:** The bank must have actual or constructive possession of the goods before it can sell them. The bank cannot sell the asset if the supplier has not delivered it.

Hence, under an MPO contract, the bank must own the goods *and* must possess them before it can resell them to the customer.

2.1.3.2 Promise Agreement (Wa'd)

In an MPO, the customer promises to buy the goods from the bank. In this respect, two questions arise:

1. Is the promise (wa'd) binding from a Sharia perspective?
2. To what extent is it enforceable in a court of law?

A. Binding Promise

Wa'd is a unilateral promise that is used to mitigate risks in a number of Islamic financial transactions including MPO, Ijara (leasing), and musharaka (partnership). Contemporary jurists have different views on a unilateral promise. Some jurists consider the fulfillment of a unilateral promise to be recommendable but not obligatory; whereas many others consider that unilateral promises are obligations that the promisor needs to fulfill, especially if the promisee would suffer losses if the promise is not fulfilled.

- **Non-binding promise:** If a bank's Sharia scholars opine that a unilateral promise is non-binding, then the customer is not compelled to fulfill it. As a result, if the customer decides not to buy the asset once the bank has purchased it, the bank will face the risk of incurring losses.
- **Binding promise:** If, on the other hand, the Sharia scholars are of the view that a unilateral promise is binding on the person making the promise, then the bank can claim compensation for the damages incurred for the non-fulfillment of the promise – provided that the agreement is enforceable in a court of law or through arbitration.²⁶

Sharia scholars differentiate between a binding unilateral promise and a binding bilateral promise. A bilateral promise is permissible only if it is binding to one of the counterparties or to none of them.²⁷ A binding bilateral promise, where the customer is bound to buy the good from the bank and the bank is bound to sell it to the customer, is similar to a forward contract and therefore is not permissible.

B. Enforceability in a Court of Law

Secular laws have not been drafted to take into consideration Islamic finance. Hence, a unilateral promise agreement could be binding according to the Sharia but may not necessarily be enforceable in a court of law. In such circumstances, there is a risk that the client may not fulfill his promise once the bank acquires the asset. On the other hand, a Sharia board may consider a unilateral promise non-binding even though it is enforceable in a court of law.²⁸

²⁶ From a Sharia perspective, the bank cannot ask to be compensated for the opportunity cost.

²⁷ AAOIFI, Sharia Standard 8, Murabaha to the Purchase Order, section 2/3

²⁸ Courts of law in different jurisdictions could reach different enforceability rulings. This is because the doctrine of 'consideration' is firmly fixed under common law but is not under civil law.

2. Structure Mapping of Debt-like Transactions

Islamic banks attempt to resolve this dilemma by resorting to arbitration, especially in countries where it is possible for the parties to ask the arbitrator to resolve the dispute according to Sharia. By resorting to arbitration, the parties ensure that the rights and obligations granted to them by Sharia will not be altered, as might be the case in a court of law. In such circumstances, the bank will still be able to enforce the fulfillment of the promise or ask to be compensated for the losses suffered if it faces difficulties in disposing of the asset, even if the promise is not enforceable in a court of law, provided that it is Sharia binding.

2.1.3.3 Applicable Rules

In addition to adhering to all the rules governing a sale contract, an MPO should meet the following conditions:

1. **Money Exchange:** Currencies cannot be the object of sale in a deferred payment murabaha contract. Under the rules of currency exchange (*bai' al sarf*), the exchange of one currency for another must be carried out on a cash basis, otherwise it is *riba*.
2. **Discount:** The bank should inform the customer of any discount received from the supplier and pass on the discount to the customer in the form of reducing the cost of sale.²⁹ As a result, Islamic banks are better off charging the customer a lump sum profit margin. This will enable them to achieve a higher rate of return when receiving discounts.³⁰
3. **Deferred Payment:** The bank must disclose to the customer whether it purchased the asset from the supplier on cash or deferred payment basis.³¹
4. **Selling Debt:** Debt cannot be the object of sale in an MPO. The mark up charged by the bank over the principal of the debt is *riba*.
5. **Rescheduling the debt:** Murabaha is not a loan but a sale that results in the transfer of ownership of the object of sale to the buyer. Hence, extending the maturity of an MPO by a second MPO is not possible.
6. **Prepayment:** The customer does not have the right to receive discounts for prepayments. An MPO contract that includes a clause stipulating this right is void. However, the bank can – at its own discretion – provide a discount to the customer for early payments.
7. **Late Payments:** The bank cannot ask to be compensated for late payments: it can only ask to be paid back the amount it is owed. However, contemporary jurists have allowed the bank to charge delinquent customers a penalty.³² Even so, the proceeds of penalty fees cannot become part of the bank's income: they must be donated to charity on behalf of the customers.³³ Such penalty fees are a way of dealing with moral hazard and deliberate delays problems. In some cases, the bank can use the penalty fees to provide interest-free loans to people in need – but only after taking the approval of its Sharia scholars.

29 AAOIFI, Sharia Standard 8, Murabaha to the Purchase Order, section 4/5

30 In the absence of any discount, the bank's rate of return will not vary if the cost of a car is say USD 10,000 and the markup is a lump sum of USD 1,000 or 10 percent. If, however, the bank gets a discount of 5 percent from the supplier, its cost becomes USD 9,500 and the rate of return on this MPO deal will rise if he originally asked for the lump sum of USD 1,000.

31 AAOIFI, Sharia Standard 8, Murabaha to the Purchase Order, section 4/3.

32 Resolution 53, The fifth annual session of the Islamic Fiqh Academy, Jeddah.

33 The penalty charge is a way of putting pressure on the borrower to repay the debt.

8. *Amending Terms of Agreement:* It is permissible to amend the terms of the Promise Agreement after signing it and before concluding the murabaha transaction if **both** the bank and the client agree to the amendment.

2.1.3.4 Features of an MPO

An MPO contract could include the following terms:

- **Security and Guarantee:** The bank may ask for an appropriate security, such as a lien or a mortgage, to ensure the fulfillment of the payment of the debt. Likewise, the bank may ask for a third party guarantee. In case of default, the guarantor will pay the debt.
- **Promissory Note:** Sometimes the bank asks the customer to sign a promissory note. If the bank decides to sell the note to a third party, he must sell it at its face value.
- **Earnest Money (Hamesh al-jadiyya):** The bank may ask the customer for an 'earnest money' deposit to show his seriousness in fulfilling his promise.

Banks are free to charge a higher price for credit sales in comparison with spot sale, as well as higher mark ups for longer maturities, provided that the MPO contract specifies the price and maturity. For example, the contract cannot stipulate that the price the customer has to pay after 6 months is \$1,000; after 12 months \$1,100 and so on. Such a contract is not Sharia compliant and subsequently is void.

2.1.4. Commodity Murabaha

A commodity murabaha is a mode of financing that provides cash advances to a bank's customers. Islamic banks use it for bridge financing, working capital financing and for interbank placements. Under a commodity murabaha contract, the bank sells the customer a specified quantity of a commodity, usually base metals listed on major commodity exchanges (for example, platinum or palladium), on credit. The customer then sells the commodity immediately to receive cash.³⁴ As a result, commodity murabaha mimics an interest-bearing loan.

In a commodity murabaha, it is possible to roll over the debt by simply replicating the first murabaha transaction. An example of this occurred when, Saudi Zain, a mobile phone operator in Saudi Arabia, entered a two-year marabaha facility to repay a previous murabaha in 2010 (*Reuters, 23 January 2010*).

³⁴ Commodity murabaha is a controversial form of financing, with many, though not all, scholars criticising it on the grounds that in practice, commodities sometimes never actually change hands in a commodity murabaha.

2. Structure Mapping of Debt-like Transactions

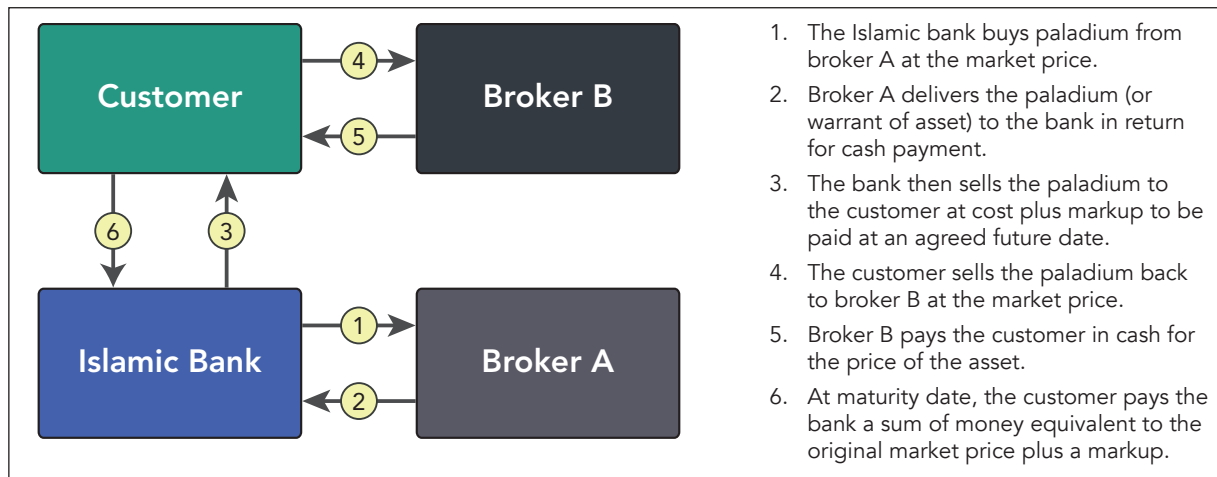


Figure 2.2 Commodity Murabaha

2.1.5 Differences between MPO and Loans

An MPO contract mimics interest-bearing loans, especially if the bank takes steps to minimize the costs and risks involved in carrying out the two sales. However, although its economic substance may be functionally equivalent to a loan, an MPO and a loan are substantially different both from a Sharia and a legal perspective. From a legal perspective, an MPO financing is a sale transaction that entails debt to be repaid at an agreed specified date. A loan on the other hand, is a sum of money borrowed (principal) in exchange for repayment with interest at some future date.

The Sharia makes a clear distinction between lending and investing. Time by itself cannot create value unless it is associated with an economic activity. Thus, while both loans and credit sales are types of financial transactions that involve time, the Sharia allows for the compensation of time only in the case of a credit sale but does not account for the diminishing purchasing power of money in the case of a loan. Two principles of Islamic financing – *al ghuṇm bil ghurm* and *al kharaj bil daman* – make this clear.

- The principle of *Al ghuṇm bil ghurm* ties return to risk. Entitlement to profit or return is conditional upon the bearing of risk. As such, an MPO transaction is Sharia-compliant because the bank assumes the risk of ownership of the object of sale (e.g., damage or price volatility) in return for profit. In contrast, an interest-bearing loan is prohibited because the bank receives interest on the principal borrowed without assuming any such risk.
- The principle of *Al kharaj bil daman* links the entitlement of benefits to the bearing of ownership liability. In other words, the buyer of an asset is entitled to its benefits to the extent that he assumes its risks.

Murabaha	Interest-bearing loans
A cost plus markup sale	An interest-bearing loan
The bank cannot earn a fee for late payments. It can charge a penalty for late payment but must give it away to charity	Delay in payment results in charging an interest rate that is proportional to the period of delay
Early payment does not guarantee a discount.	Early payment results in discounting
The bank cannot roll over the murabaha transaction simply because it has transferred the ownership of the object of sale to its customer	Rollover of the loan is possible in return of paying interest for the extended period.

2.1.6 Tax Implications

In many countries, tax laws impede the growth of the Islamic financial services industry. The contractual forms of Islamic modes of financing are different from those of a loan, even if their economic substance is functionally equivalent. Hence, it can happen (and sometimes does) that Islamic modes of finance are taxed more heavily than their conventional equivalents, and this puts them at a commercial disadvantage. As a result, a number of countries have amended their tax laws to provide a fair tax treatment for Islamic modes of finance, and so to enable both individuals and businesses to have access to competitively priced Islamic financing.

A number of non-Muslim countries have realized that removing such tax disincentives promotes fairness and creates an opportunity to attract investments and create jobs. For example, in the U.K., the Finance Acts of 2005 and legislated tax treatment for “alternative finance arrangements.” Similarly, Luxembourg has introduced the tax legislation necessary for dealing with murabaha and sukuk transactions (circular L.G.-A no. 55 2010).

Illustration 2.4 Tax Implications

Ali, a talented calligrapher, and his wife Mariam, a successful graphic designer, decide to establish a new business under the name of *Ibn Muqlah*. The firm provides high quality designs of letterheads and business cards. They approach an Islamic bank to finance the purchase of computers and software through murabaha. The total cost of the goods is USD 15,000 – including the sales tax.

The bank offers the couple a one-year financing in return for a 5% markup. This is less than the 6% interest charged by conventional banks on loans. Both Ali and Mariam were excited and agreed to the terms.

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The bank purchased the goods and resold them to the couple. But the couple had to pay an additional 5% sales tax on the new price of \$15,750 (cost of \$15,000 plus the markup of \$750) or the equivalent of \$787.5. Under the existing tax laws, a murabaha contract constitutes two separate sale transactions and incurs sales tax on both of those transactions. In the end, despite the relatively low profit margin, Ali and Mariam ended up paying a cost of financing much higher than expected.

2.2 Salam Financing

It is evident from the foregoing discussion that for a sale to be valid, the seller must own the subject matter of the sale and must possess it either physically or constructively at the time of sale. The two exceptions are the salam and Istisna forward sale contracts.

A classic salam is the forward sale of fungible commodities. The buyer fully prepays the price in return of receiving the object of sale at a certain specified future date.³⁵ This type of forward sale contract was primarily used to allow farmers access capital to grow their crops and fulfill their consumption needs up to the time of harvest.³⁶ In later centuries, when Islam stretched across the Middle East and into parts of Europe, salam was used by investors to place textile orders from workshops located in Andalusia, Egypt and Syria, among other centers.³⁷

As a result of new technologies and innovative production processes, the nature of goods is being transformed and in some cases have become fungible. As a result, goods that could not be traded salam in the recent years, are becoming the object of a salam sale today.

2.2.1 Terms and Rules of Salam

While salam was originally a *forward sale* of fungible commodities, it has become a *mode of financing* that provides a Sharia compliant alternative to interest-bearing loans for the purpose of financing agricultural production and international trade.³⁸ For salam transactions to be Sharia compliant, they must adhere to the following rules:

1. **Full prepayment:** The price of the object of sale must be fully paid in advance.³⁹ A partial prepayment renders the transaction void since this is equivalent to the sale of debt for debt.
2. **Non-specific goods:** The salam sale of particular goods is not permissible; only non-specific

³⁵ This is different from a conventional forward contract where both the asset and the price are to be exchanged at an agreed future date.

³⁶ At the time of the Prophet (pbuh), the delivery date varied between one and three years.

³⁷ This was possible due to the introduction of new techniques that led to standardized production. See Johansen B., *Le Contrat Salam, Droit et formation du capital dans l'Empire abbasside (XIe et XIIe siècle)*, Annales HSS, 61e année, n° 4, juillet-août 2006, pp.863-899

³⁸ Contemporary jurists consider that products that are manufactured by using standardized production techniques can be the objects of salam sale.

³⁹ Some jurists have allowed payment to take place within two to three days - at the most - of signing the contract (AAOIFI, Standard 10, Salam and Parallel Salam, Clause 3/1/3)

goods can be the object of sale. For instance, the produce of a particular tree cannot be sold salam, because it is uncertain whether the seller will be able to deliver the produce under all circumstances. For the salam contract to be valid, the seller must commit to deliver an agreed quantity of the produce without specifying the tree or grove.

3. **Specification of goods:** The object of a salam sale must be precisely determined both in terms of quality and quantity. For instance, cultured pearls cannot be traded by using salam contracts since no two pearls are exactly alike.
4. **Riba commodities:** A salam contract must comply with the exchange rules of the six riba commodities; i.e., gold, silver, wheat, barley, dates, and salt. In this respect, the use of salam in currencies renders the transaction void. Since the gold and silver rule is applicable to currencies, they can only be traded on the spot.⁴⁰ The exchange of one currency spot for another to be delivered at a certain future date is prohibited since it has an element of riba.
5. **Use of debt as payment:** The buyer cannot use an outstanding debt owed by the seller or by a third party as payment in a salam transaction. This sale of debt for debt renders the salam contract void.
6. **Availability of goods:** The object of the sale must remain available in the markets at the delivery date.⁴¹ This is so that the seller will be able to purchase the goods in the market and make delivery if a defect is found or the specifications are not met in the case of the original goods. In such circumstances, the buyer is faced with three options:
 - (a) Wait until the object of sale becomes available in the markets;
 - (b) Cancel the salam contract and ask for a refund. The refund should not exceed the price paid in advance;
 - (c) Agree to exchange the object of sale for another good.⁴²

As in the case of murabaha, the buyer can ask for an appropriate security to ensure the fulfillment of the salam contract. Likewise, the buyer can charge the seller a penalty fee to be donated to charity in case of late delivery.

2.2.2 Mode of Financing

In a salam contract, the bank pays the price in advance and receives the commodity or product at a future date. However, the bank has no use for the goods purchased – it is simply providing a Sharia compliant alternative to interest bearing loans for the purpose of financing agricultural production and international trade. As a result, the bank has to look for ways to resell the goods. The three alternatives used to dispose of the object of a salam sale are the parallel salam, the promise agreement, and the agency contract.

40 Resolution 21, The third annual session of the Islamic Fiqh Academy, Jeddah

41 Jurists have different opinions as to whether the object of sale must be available in the market from the inception of the contract until the delivery date or whether it is a sufficient condition for the object of sale to be available in the markets only at the delivery date. The majority of scholars take the latter opinion.

42 AAOIFI Sharia Standard 10, Salam and Parallel Salam, Section 5/8

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2.2.3 Parallel Salam

Salam/Parallel salam is the structure that most Islamic banks prefer. It involves two separate contracts whereby the bank is the buyer in the salam contract and the seller in the parallel salam contract. This structure comprises the following steps:

1. The customer approaches the Islamic bank for financing. He provides the bank with the commodity or product specifications and negotiates the price and delivery date;
2. After agreeing on the terms, the bank pays the price in advance and expects the customer to deliver the goods at the agreed future date;
3. Following the signing of the salam contract and making the prepayment, the bank enters into a parallel salam agreement with a third party. The bank offers to sell the goods under similar specifications and conditions;
4. The counterparty pays the price in advance and expects to receive the goods at the agreed future date;
5. Once the customer delivers the goods to the bank, the bank makes delivery to the counterparty.

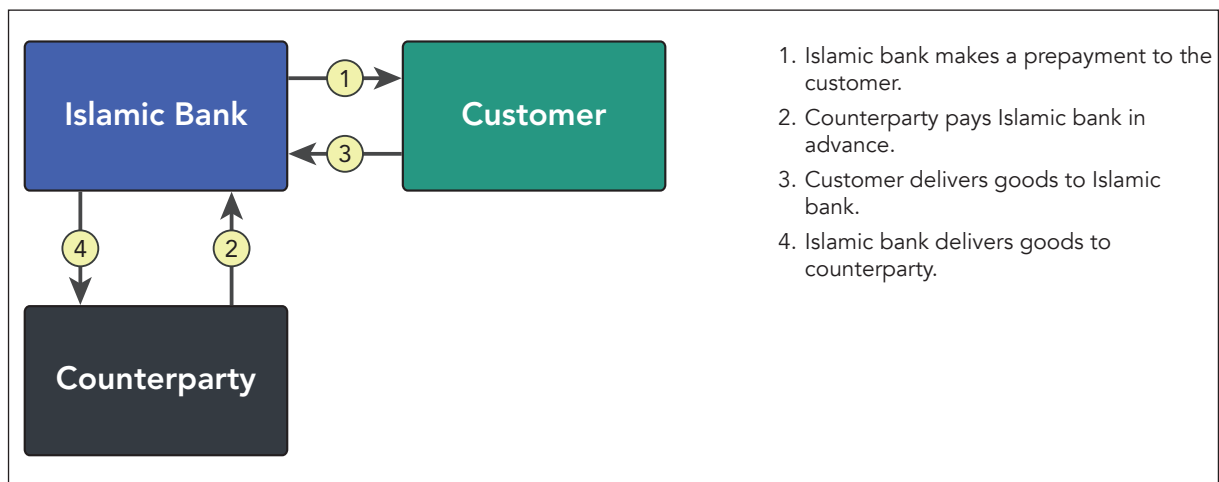


Figure 2.3 Salam and Parallel Salam

The salam and the parallel salam contracts are independent of each other: the delivery of goods to the counterparty cannot be contingent on the customer's delivery. If the customer does not fulfill his obligations, the bank is forced to purchase the goods from the market and make delivery to the counterparty.

2.2.4 Promise Agreement (Wa'd)

In some cases, it is not easy to find a third party willing to enter into a parallel contract that replicates the same specifications and conditions of the original salam transaction. Since the bank cannot sell the goods before taking possession, an option would be to get a promise from a third party to purchase the goods.

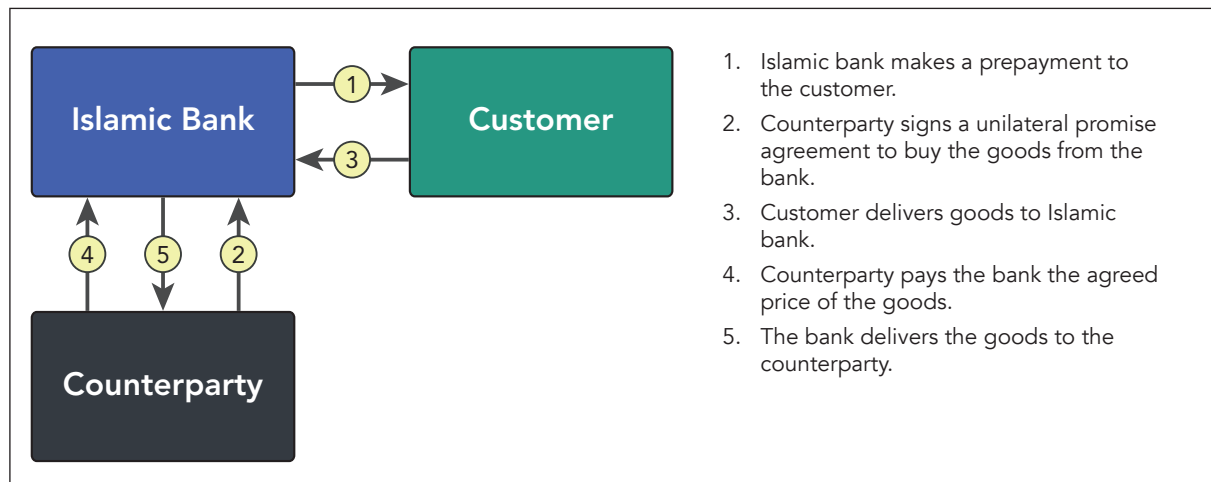


Figure 2.4 Salam and Promise Agreement

Illustration 2.5 Salam and Murabaha

A number of citrus growers approach an Islamic bank for financing. The bank agrees to purchase one thousand tons of oranges to be delivered equally at the end of November and December 2011 for the prepaid price of 50 cents per kilogram. The bank then called a client who owns a juice processing plant and offered to sell the oranges under a murabaha contract to be signed once the bank takes possession of the oranges. The client liked the deal and signed a promise agreement to buy one thousand tons of oranges for the price of 60 cents per kilogram to be paid by the end of June 2012. As a result, the citrus growers were able to sell their produce and finance their consumption needs beyond the harvest time while the juice processing plant sold the juices before even paying for the oranges bought.

2.2.4.1 A Binding Promise

In a murabaha contract, the time interval between the promise agreement and the execution of the sale is only a matter of days at most. During this period, it is most unlikely that prices would change dramatically. In contrast, since the time interval is much longer under a salam and promise agreement, prices might be subject to large fluctuations. Accordingly, under certain circumstances, the binding nature of the unilateral promise becomes irrelevant. Specifically, if at the delivery date the market price is higher than the cost at which the bank purchased the goods at but lower than the “promised” price, the buyer will have an incentive not to fulfill his promise and because the bank will not incur any losses, it cannot claim compensation. On the other hand, even if the market price is lower than the bank’s cost, the buyer will still have an incentive of not fulfilling his promise. In this case, the buyer will have to pay

2. Structure Mapping of Debt-like Transactions

a price equal to the bank's cost that is lower than the "promised" price. Only when the market price is higher than the "promised" price will the buyer fulfill his promise.⁴³

2.2.5 Agency Contract

The bank as a financial intermediary may be restricted by the supervisory authorities or may lack the expertise to sell the goods. In either case, the bank can appoint the customer or a third party as its agent to sell the goods in the market for an agreed price.

2.2.6 Differences between Salam and MPO

Although both salam and murabaha are debt-like financing instruments, they differ substantially.

Salam	Murabaha
A discount sale	A cost plus markup sale
Price fully paid in advance	Price paid on the spot, in installments or as a lump sum deferred payment
Object of sale delivered at an agreed future date	Object of sale delivered on the spot
Object of sale cannot be a particular good	Object of sale must be a particular good

2.3 Istisna

Istisna is a *forward sale contract* whereby the buyer commissions the seller to manufacture a product according to certain specifications and quantities in return for an agreed price. Payment can take many forms including:

- Full or partial prepayment;
- Lump sum payment at delivery date;
- Installment payments up to the delivery date and even beyond;
- Installment payments tied to work progress.

Istisna is the exception to the rule that prohibits deferring both the delivery of the manufactured product and the payment for them. Under an Istisna contract, the object of sale may not even exist at the inception of the Istisna contract but will be manufactured and delivered at an agreed future date; and the price may be fully or partially paid at some future date. In all other forms of sale, either the object of sale must be delivered immediately or its price must be fully paid in advance or both.

43 Although the bank has an incentive in this case to sell to a third party at the market price, it will face a reputational risk.

Illustration 2.6 Istisna

The manager of *Taj Lahouri*, a five-star hotel, approached Tabriz, the finest manufacturer of hotel carpets to place an order for 30,000 square meters of high quality patterned carpets. After negotiating the terms, both parties agreed on a price of \$15 per square meter or a total of USD 450,000 to be paid 50 percent in advance, and 50 percent upon delivery in 90 days.

2.3.1 Istisna and Parallel Istisna

Istisna and parallel istisna is another mode of financing used by Islamic banks to provide a Sharia compliant alternative to interest-bearing loans. It can be used for the purpose of financing most manufacturing and construction projects including airplanes, ships, buildings, roads and bridges. Istisna and parallel istisna involve the following steps:

1. A customer approaches the Islamic bank to obtain financing for the manufacturing of a certain product or the construction of a specific project. He provides the bank with specifications and negotiates the price, payment modality and delivery date;
2. After agreeing on the terms and conditions, the customer signs an Istisna contract asking the bank to manufacture the product;
3. Following the signature of the istisna contract, the bank enters into a parallel istisna with a manufacturer under similar specifications as in the original istisna agreement;
4. Once the manufacturer delivers the product to the bank, the bank makes delivery to the customer.⁴⁴

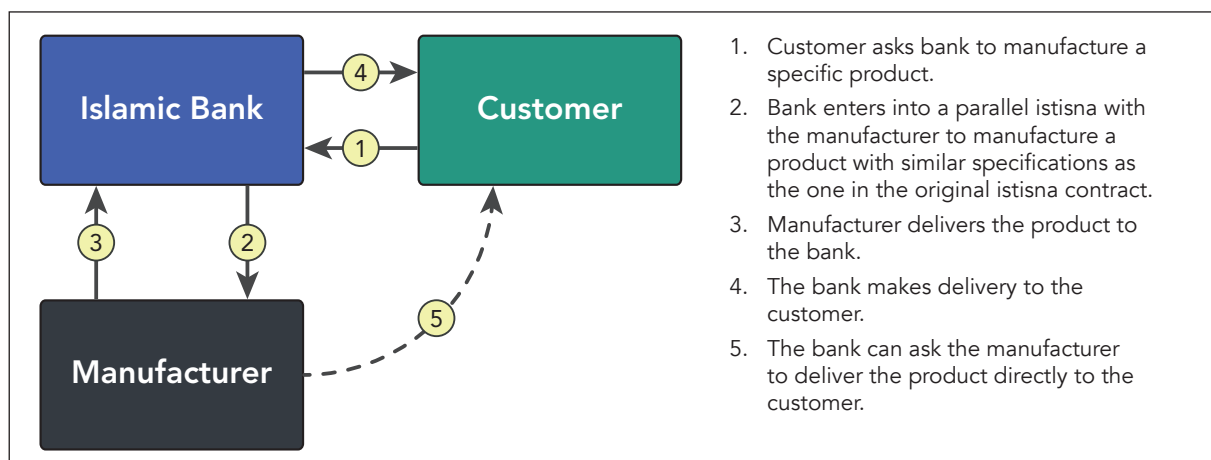


Figure 2.5 Istisna and Parallel Istisna

⁴⁴ The bank can instruct the manufacturer to deliver the product directly to the customer.

2. Structure Mapping of Debt-like Transactions

The istisna and parallel istisna structure may be used to transform short-term obligations into long term financing. For instance, the bank can settle all payments due to the manufacturer up to the delivery date while agreeing with the customer on installment payments that go beyond the delivery date. The bank's profit amounts to the present value of the difference between the payments it receives from the buyer and the payments it makes to the manufacturer.

Illustration 2.7 Istisna and Parallel Istisna

Ibn Sina Elementary School approaches the bank to finance the manufacturing of adjustable-height school desks. The director of the school informs the bank that the manufacturer sent him a price quotation of USD 125,000 for the order to be paid as follows: 25 percent upon signing the contract, 25 percent in three months, and the balance at the time of delivery in six months. The bank, having dealt previously with the manufacturer, calls him and renegotiates a better deal. As a result, the manufacturer agrees to give the bank a discount of 10 percent. The bank calls back the school director and offers to manufacture the adjustable-height desks according to the specifications and quantities provided by the school for the total price of USD 130,000 to be paid in 24 equal installments. Finally, the bank as the seller signs an istisna contract with the school and as the buyer signs a parallel istisna contract with the manufacturer.

2.3.2 Terms and Conditions of Istisna and Parallel Istisna

Jurists specify the terms and conditions for the permissibility of the istisna and parallel istisna contracts. These conditions pertain to (1) the object of sale, (2) price, (3) security, (4) contracts independence, (5) discount, (6) penalty fee, and (7) binding contract.

1. **Object of sale:** A valid Istisna contract is one that satisfies the following terms and conditions pertinent to the object of sale:

Istisna can only be concluded on manufactured products or construction projects. Agricultural products and other non-manufactured items cannot be the object of an istisna sale unless they have been subjected to manufacturing; e.g. frozen vegetables or canned fruits.

- The subject matter can be a custom made manufactured product or a “precisely replaceable” one. In the later case, the product could be tangible such as computers or intangible such as gas and electricity.
- The object of sale cannot be a specified existing product such as this book that you are reading, but it can be a product with specific characteristics such as a copy of the book you are reading.

- The seller can deliver a product manufactured prior to concluding the agreement or a product manufactured by someone else.⁴⁵
- 2. **Price:** The price can be money, any agreed upon tangible good, or the usufruct of a specified asset including the object of Istisna sale. The latter case is common in BOT (Build, Operate, Transfer) projects whereby the contractor receives a concession to operate the facility for a certain period of time in return for financing the design and construction of the facility. The price can be renegotiated after the inception of the contract if changes to the object of sale are required. For instance, the buyer may ask the manufacturer to add RAMs or increase the capacity of the hard disk of a laptop being manufactured in return for higher price.
- 3. **Security:** Both the seller and buyer can ask for a security or guarantee to ensure the fulfillment of the contract: the buyer to ensure that the product will conform to the agreed specifications and will be delivered on time, and the seller to ensure prompt payment.
- 4. **Contracts Independence:** The istisna and parallel istisna agreements should not be linked one to the other. The rights and obligations of one contract should be completely independent from those of the other. Thus, the bank will still be under the obligation to deliver to the customer a product that meets the specifications even if the manufacturer provides the bank with a defective product or fails to deliver on time.
- 5. **Discount:** The bank can keep the discount received from the manufacturer and is not obliged to give it back to the buyer, as is the case with murabaha.
- 6. **Penalty Fee:** The buyer can charge the manufacturer a penalty fee for late delivery. The fee represents income and need not be donated to charity as in murabaha or salam. It is a way of ensuring that the manufacturer will devote the effort to produce the item and deliver it on time rather than engaging in other contracts to increase his income. However, the manufacturer is not entitled to be compensated for late payments since such compensation is considered riba.
- 7. **Binding Contract:** Sharia scholars generally agree that both the murabaha and salam are binding from the inception of the contracts. However, they disagree as to the extent to which an istisna contract is binding. Is an istisna transaction binding from the time the contract is signed or from the time the manufacturer starts producing the object of sale? Many contemporary scholars consider istisna to be binding from the inception of the contract. Still, there are others who assert that both parties have the right to rescind the contract as long as the manufacturer has not started working on the object of sale. The minute he starts manufacturing the product, the contract becomes binding to both parties. From that point, neither the buyer nor the seller will have the right to unilaterally cancel the contract.⁴⁶

45 AAOIFI Sharia Standard No. 11, Istisna and Parallel Istisna, Section 3/1/5. It should be noted that not all jurists support this view. There are others who consider istisna to be valid only if the product to be delivered is manufactured after the contract is signed.

46 Classic jurists consider istisna to be non-binding to either party.

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2.3.3 Differences between Salam and Istisna

Both salam and istisna are forward sale contracts and in both cases the object of the sale may be non-existent or not owned by the seller at the inception of the contract. However, they differ in many respects.

Istisna	Salam
Object of sale could be fungible or custom made	Object of sale must be fungible
Object of sale can only be a manufactured product	Object of sale could either be manufactured or non-manufactured
Price paid on the spot, in installments or as a lump sum deferred payment	Price fully paid in advance
Time of delivery need not be fixed at the inception of contract	Time of delivery must be specified at the inception of contract
Object of sale may not exist in the market at delivery date.	Object of sale must exist in the market at delivery date

2.4 Ijara & Ijara Muntahia-bi-Tamleek

Ijara or leasing has been used as a form of financing for thousands of years. The Phoenicians first introduced lease structures that resemble modern financial leases. These were long-term leases covering the economic life of the ships and transferring the benefits and obligations of ownership to the lessee. And yet, despite being well known for such a long time, until recently, leasing was mostly confined to arable lands, primitive agricultural tools and domestic animals. It was the industrial revolution and the technological advances of the last two centuries that led to the substantial increase in the amount and types of manufacturing and transportation equipment leased; e.g., railcars, locomotives, ships, aircrafts, mainframes, laboratory equipment, satellites.

2.4.1 Conventional Leases

Leasing is an alternative to buying assets. It is an agreement between the owner of an asset (the lessor) and its user (the lessee) whereby the lessor transfers the right to use the asset to the lessee for a specified period of time in exchange for periodic payments.

There are two types of leases: an operating lease and financial lease. An operating lease is a short-term lease that individuals and firms resort to when they need to use equipment for brief periods of time. For example, a tourist visiting another country might lease a car for few days or a farmer harvesting the crop might lease a harvest machine for a day or two. At the end of the lease period, the lessee returns the asset to the lessor. In contrast, a financial lease is a long-term lease that extends over most of the economic life of the asset. Firms use financial leases as a source of financing and its payment obligations are similar to those of a secured loan.

Operating Lease	Financial Lease
Short term	Long term, extends over the economic life of the asset
Cancellation option	Non-cancellable
Lease vs. buy	Lease vs. borrow
Lease payments are reported as operating expenses; lease does not affect the balance sheet	Leased property is recognized as an asset and payment obligations as a liability on the balance sheet
Lessor retains legal title to the property	Lessee has the option to acquire the asset at the end of the lease for a residual value
Lessor assumes the risks and benefits of ownership	Transfer of most of the risks and benefits to lessee
Maintenance and insurance born by lessor	Maintenance and insurance born by lessee

2.4.2 Why Lease?

Firms resort to leasing rather than acquiring assets for a number of reasons including the following:

- When the lease equipment is only needed for a short period of time;
- When the lessor can take advantage of accelerated depreciation to pass some of the tax benefits to the lessee in the form of reduced lease payments;
- To hedge against technological obsolescence, for example, when the costs of acquiring new technology are prohibitive;
- To free up credit facilities for other purposes;
- To preserve cash flows: this is especially true in the case of SMEs and start-up companies.

2.4.3 Ijara

Jurists define classic ijara as the sale of usufruct of a particular property. It entails the transfer of ownership of the usufruct to the lessee for a specified period of time in exchange for an agreed compensation. The lessor retains legal title to the property. Because of its asset-based nature, Ijara became another *mode of financing* used by Islamic banks to provide a Sharia compliant alternative to interest-bearing loans. Ijara muntahia bi-tamleek (IMT) is comparable to a financial lease with regard to its life span and transfer of ownership to lessee. It has been used for the purpose of financing machinery and equipment. IMT involves the following steps:

1. The lessee identifies the equipment he wants to lease and negotiates the price with the supplier or manufacturer;
2. The lessee approaches the bank and negotiates the terms and conditions of the lease. He signs a promise agreement to lease the asset as soon as the bank acquires it from the supplier;

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3. The bank buys the asset and pays for it;
4. The bank signs a lease agreement with the lessee based on the terms and conditions specified in the promise agreement;
5. The bank signs a promise agreement to transfer the ownership to the lessee at the end of the lease term. Title can be transferred (1) by means of a promise to sell at residual or market values; (2) by promise to give the asset as a gift whether unconditional or contingent upon payment of all lease dues;
6. The bank delivers the leased asset to the lessee;
7. The lessee starts making periodic payments to the bank;
8. At the end of the lease period the bank transfers the ownership of the asset to the lessee based on the agreed terms.

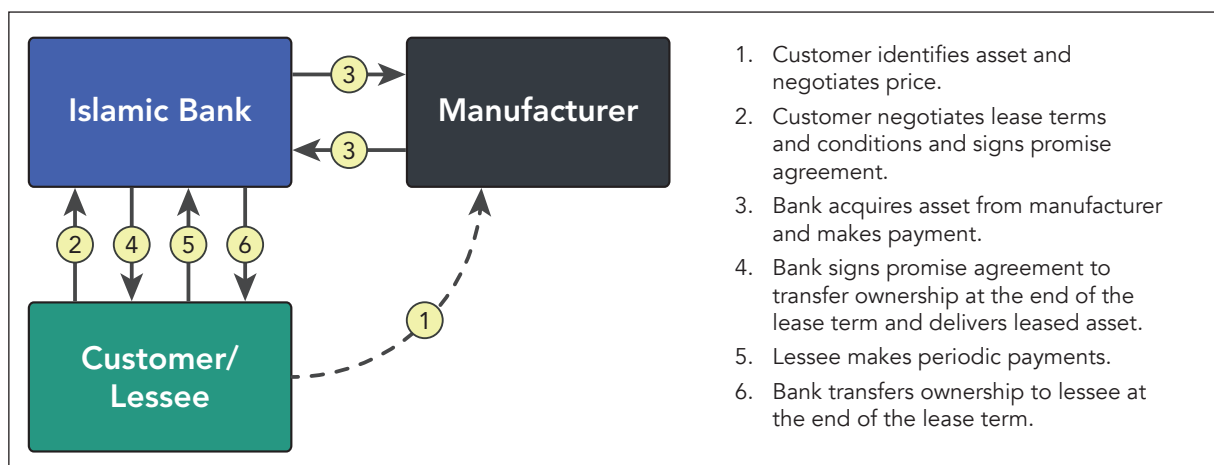


Figure 2.6 Ijara

2.4.4 Terms and Conditions of Valid Ijara and IMT Contracts

The governing rules for the validity of ijara and IMT contracts are different from those of operating and financial leases. Sharia scholars stipulate certain conditions for the permissibility of ijara and IMT. These conditions pertain to (1) the object of lease, (2) rent, (3) security, (4) termination of the lease, (5) Liabilities of the parties, (6) penalty fee.

1. **Object of Lease:** A consumable good, such as a candle or gas, cannot be the object of lease since both its usufructs and legal title cease to exist once consumed. Leasing consumable goods is tantamount to lending so this type of transaction should adhere to the rules governing loans.
2. **Rent:** Rent can be fixed over the entire term of the lease or periodically adjusted based on some agreed benchmark. For example, rent could be tied to the consumer price index.
3. **Security:** The lessor can ask the lessee to provide for a security or guarantee to ensure the fulfillment of the lease contract.
4. **Termination of Lease:** A lease contract is binding on both the lessor and the lessee. It cannot be cancelled unilaterally except under the following conditions:

- A defect or event adversely affects the usufruct. However, some jurists differentiate between fungible and non-fungible assets. If the object of the lease is fungible, the lessor is responsible to replace it. If, on the other hand, it is a non-fungible asset, the lessee has the option to terminate the lease or continue leasing at an agreed reduced rent. For example, a farmer who leases a plot of arable land may decide to cancel the lease if the land runs dry. Contrary to financial leases, the lessor cannot claim rent if the lessee loses his right to use the asset for reasons unrelated to negligence or misuse.
 - The lessee fails to make payment on time or breaches the terms of the contract by misusing the asset or using it for purposes different to those specified in the contract (for example, if the lessee turns a rented house into a kindergarten).
5. **Liabilities of the parties:** Lease separates ownership of the asset from its use. The lessor retains the legal title but transfers the right of use to the lessee. Accordingly, liabilities that transpire from ownership shall be borne by the lessor while liabilities that emerge out of negligence and misuse shall be borne by the lessee. For example, if the asset is stolen in the absence of any negligence from the part of the lessee, the lease shall terminate and the lessor loses his right to receive payments for the remaining term of the lease – as is the case of a financial lease – because the asset usufruct has ceased to exist.
 6. **Penalty Fee:** The lessor can charge the lessee a penalty fee for late payment. However, the fee must be donated to charity as in murabaha or salam. It cannot be part of the lessor's income. The fee can be tied to period of delinquency.
 7. **Maintenance and insurance:** The lessor is responsible for both maintenance and insurance.

Risk Identification - Murabaha

In Section II, we examined the structure mapping of murabaha, its features, and the terms and conditions for the validity of an MPO contract. Now we will proceed to identify the nature of risks associated with a murabaha facility. This will help us better assess and quantify each of the risks involved.

3.1. Murabaha to the Purchase Orderer

An MPO transaction is a complex web of contracts between the customer and the bank that entails three types of relationships:

- Promisor-Promisee
- Buyer-Seller/Principal-Agent
- Debtor-Borrower

The use of an MPO exposes Islamic Financial Institutions (IFIs) to various risks including credit risk, market risk and operational risk. The interaction of several exposures necessitates the development of an understanding of how risks arise and the best strategies for mitigating risks. In this context, IFIs must align their risk management strategies with their risk appetite.

For risk identification, MPO transactions are divided into two phases: phase one starts from the time the customer signs the promise agreement and runs to the time he enters into a murabaha contract. Phase two begins from the time a murabaha contract is signed and runs up to the full repayment of the debt. The major sources of uncertainty during phase one are whether the customer will fulfill his promise and whether the subject matter of the MPO will suffer damages before ownership is transferred to the client. In phase two, the major source of uncertainty is whether the customer will default on making payments.

3.1.1 Phase One: Promise Agreement → Murabaha Contract

The first thing the customer does after receiving the approval on his MPO application is to sign a promissory purchase agreement whereby he promises to buy the subject matter of the murabaha after the bank has acquired it from the supplier. Some of the risks that exist in MPO depend in part on whether the promise agreement is binding or non-binding; and so does the level of specific risks.⁴⁷ In phase one, IFIs are exposed to operational risk, counterparty risk, market risk, and legal risk.

⁴⁷ The promise agreement could be binding or non-binding depending on the Sharia board's fatwa or ruling. The majority of modern Sharia scholars consider the unilateral promise agreement to be binding although a minority of scholars disagree and argue that a promise, by nature, is non-binding. (See Section2)

IFIs are subject to operational risks in all of their murabaha transactions, whether the promise agreement is binding or non-binding. The two main risks encountered during this phase of the murabaha transaction are:

- The risk that the customer breaks his promise and refuses to purchase the subject matter of the MPO from the bank, resulting in losses for the bank (**counterparty risk**).
- The risk that the bank will suffer losses as a result of defects or damage to the object of sale after the bank acquires it from the supplier but before selling it to the customer (**operational risk**).

In binding *murabaha*, IFIs usually manage **counterparty risk** by requiring the deposit of earnest money from the customer. A bank cannot guarantee the fulfillment of the contractual agreement nor can it compel its customer to honor his word; it can only impose a security to ensure compensation in the event of loss arising from the breach of agreement.⁴⁸ As a result, earnest money can help reduce the risk of breaking a binding promise but it does not eliminate it. The customer may still refuse to fulfill his obligation if the cost of compliance outweighs the cost of breaking one's promise.

For example, consider a company that exports cement to a neighboring country. In response to rising demand, the company decides to expand operations and approaches the bank with a promise to purchase the equipment needed. Immediately after the bank acquires the equipment from the supplier, violence erupts between opposing factions in the neighboring country and threatens to escalate into a civil war. As a result, the company decides to put expansion plans on hold. In this situation, the company may be better off compensating the bank for its losses rather than buying the equipment and ending up with the costs of idle capacity.

Earnest money can either be prudently invested in a Profit Sharing Investment Account (PSIA) for the benefit of the customer or be held in the custody of the bank. The bank cannot make the customer forfeit the deposit for breach of agreement: it must return it after deducting the amount of losses incurred. For example, a customer would be entitled to a refund of USD 100,000 if he deposited USD 250,000 as earnest money but the bank suffered losses in the amount of USD 150,000 due to a breach of contract.

However, the risk of breach of agreement cannot be reduced through the use of earnest money in non-binding *murabaha*. It can only be managed through sale-or-return contracts.⁴⁹ Under this type of arrangement, the bank has the right to return the object of sale to the supplier within a specified time period.⁵⁰ The risk of loss or damage, however, is passed to the bank from the time it takes possession of the object of sale until it returns it to the supplier.

The second source of uncertainty for the bank takes place between the time the bank takes possession of the object of sale and the time the *murabaha* contract is signed. Because the object of sale may have defects, or may be damaged, lost or destroyed during this time interval, the bank is exposed to **operational risk**. One way to reduce the time period between the two sales to a minimum and to

⁴⁸ The promisor is required either to fulfill his promise or to indemnify the bank in the event of loss (Fiqh Academy of OIC, Resolution # 40-41(5/2 and 5/3), 1988).

⁴⁹ In addition to requiring earnest money in binding murabaha, IFIs resort to sale-or-return contracts, whenever possible, to hedge type 1 risk exposure.

⁵⁰ The bank will still have to pay for return shipping costs.

3. Risk Identification - Murabaha

mitigate this type of risk is to assign the customer as the bank's agent in taking possession of the object of sale from the supplier after checking for defects and damages and conforming specifications. This will almost eliminate the possibility that the customer will refuse to purchase the goods because of defects or damages. Once the object of sale is in possession of the agent, the murabaha contract can immediately be signed.

One case in which the bank suffers losses even if the risk of ownership has been transferred to the customer is when a non-conformed object of sale is damaged in transit. From the moment the customer receives the bill of lading from the bank and takes constructive possession of the object of sale, he bears the risk of damage or loss unless the shipment does not meet the specifications agreed upon.⁵¹

For example, consider the case of a bank that orders 25,000 boxes of yellow antimalarial drugs from a foreign supplier to be resold under a murabaha contract to a local pharmaceutical company. The supplier uses color-coding to differentiate age groups: yellow is intended for younger children and blue for older children. If the supplier ships blue color drugs instead and the shipment is damaged in transit, the bank suffers the loss.⁵² On the other hand, if he ships yellow color drugs, the company bears the loss.⁵³ One way the bank can mitigate this risk is by stipulating in the *murabaha* contract that it is released from any liability for defects and by assigning to the customer the right of recourse against the supplier. The bank must ensure, however, that any warranty covering defects is not limited to original purchaser (the bank) but can be transferred to its customer.

A non-binding murabaha gives the customer the option but not the obligation to buy the subject matter of the MPO. If the customer breaks his promise and refuses to buy the object of sale, the bank is exposed to *counterparty risk* that could result in a *market risk*. In this situation, if the bank is unable to return the *murabaha* object of sale to the original seller, it is forced to find another buyer or dispose of these unwanted goods. The bank could be at risk of suffering losses if prices fluctuate or if market conditions force it to sell at a discount. Suppose a company signs a non-binding promise agreement with the bank for the purchase of 10,000 tons of iron ore for the price of \$150/ton. If, immediately after the bank purchases the commodity for \$135/ton, prices drop to \$130/ton and the client refuses to fulfill his promise, the bank could suffer losses amounting to USD 50,000. Among the incentives that compel customers to honor their word is the concern for their reputation among banks and most importantly their interest in not jeopardizing the business relationship with the bank they are dealing with.

In cross-border *murabaha*, the bank can also be exposed to *foreign exchange risk* (market risk) when the currency the bank uses to pay suppliers is different from the currency it receives from its customers. The bank can manage this risk by agreeing with its customers to price and receive payments in local currency while exchanging the local currency for foreign currency to pay suppliers. In that event, the bank protects itself reasonably well against exchange

51 This type of risk can be hedged by buying insurance coverage against hazards in transit.

52 The bank can have recourse against the foreign supplier for losses incurred.

53 Price discounts provide a solution to remedy non-conformity of the object of sale.

rate fluctuations, provided the *murabaha* is binding **and** the bank pays the supplier in cash. However, the bank could face losses if it buys on credit.

Consider the example of an Indonesian bank that buys five million pounds of cotton from a foreign supplier at the price of 94.28 U.S. cents per pound, and plans to resell the cotton to a local cotton fiber manufacturer under an MPO contract. The manufacturer agrees to pay the bank a markup of 1 percent and to settle payment in rupiahs 60 days from the delivery date. If the exchange rate at the time of sale is 8,870 rupiahs per dollar, the customer will pay the bank the total amount of 42.2 billion rupiahs. But since the bank purchased the cotton on credit, it risks losing money in case of currency devaluation. For instance, if the bank exchanges 9,148 rupiahs for every dollar to pay the supplier, it will suffer a loss of 893 million rupiahs.^{54,55} **n**

The bank's exposure to foreign exchange risk depends on the volatility of the currency and its ability to mitigate this exposure. The larger the exchange rate volatility and the less the bank's hedging ability, the larger the potential loss that may be suffered. On the other hand, the lower the currency fluctuation and the greater the bank's hedging ability, the smaller the risk exposure. Foreign exchange risk is totally eliminated when the exchange rate is pegged. Under floating exchange rate regimes however, banks can hedge currency risk associated with certain *murabaha* transactions by resorting to cross currency swaps.⁵⁶

3.1.2 Phase Two: Murabaha Contract → Debt Paid in Full

The bank may be exposed to **credit risk** at any time between the signing of the *murabaha* contract and the time the debt is paid in full. It may suffer losses if its customer fails to repay the debt on time and in full. Accordingly, IFIs are more likely to be exposed to credit risk when the maturity schedules on their financing facilities are longer: there will be a greater chance that, despite the customer's willingness to fulfill his obligations, he will not be able to pay the debt in full due to unforeseen circumstances. If the borrower defaults, the payments that the bank is expecting are at risk.

It is a common practice among IFIs to use collateral as security against the risk of default. Should the customer fail to repay the debt, the ownership of the collateral is transferred to the bank. However, the bank may encounter problems repossessing the collateral especially when the legal process or foreclosure is slow, as is the case in most developing countries, which is where most IFIs operate.⁵⁷ Furthermore, illiquid collateral require longer periods of time to sell, so even when the bank has possession of the collateral, it may not be able to recover all the value it was expecting. Accordingly,

54 The bank expected to buy five million pounds of cotton at USD 0.9428 per pound (USD 4.714 million) at an exchange rate of USD 1 = Rupiah 8,870 for a total cost of Rupiah 41,813. After adding the 1% mark-up, the bank expects to be able to sell the cotton to the manufacturer for Rupiah 42,231, earning a profit of Rupiah 418. However, if the bank has to use an exchange rate of USD 1 = Rupiah 9,148 when paying the supplier, then he will pay the supplier Rupiah 43,124, suffering a loss of Rupiah 893.

55 The bank will, however, earn a higher rate of return on the *murabaha* transaction if the exchange rate appreciates.

56 Cross- currency swaps are among the very few widely accepted Sharia-compliant derivatives.

57 Although there are variations in law enforcement from one country to another, enforcement of debts is generally more difficult in developing countries.

3. Risk Identification - Murabaha

banks may require additional security in the form of third-party guarantees or promissory notes to reduce the risk of loss.

The management of credit risk is more complicated in MPOs in comparison to conventional loans due to a number of factors including: (1) the inability of the bank to roll over the debt; and (2) the prohibition of charging interest on missed payments. Since murabaha is a sale contract, it is impossible to extend the maturity of an MPO by a second MPO. Debt cannot be the object of sale of a second MPO. Moreover, banks cannot be compensated for late payments but can only impose penalty fees to be donated to charity. Thus, the bank will not be able to earn any additional return on rescheduled or delayed payments. Since the bank expects to receive cash flows on specific dates, when a customer defaults, the bank is exposed to the risk that it will not have sufficient funds to meet its obligations: the bank is exposed to *liquidity risk*.

Illustration 3.1 Muhammad al-Idrissi High School (a hypothetical school)

Muhammad al-Idrissi high school, which has recently embarked on a project to rebuild its geography and cartography library, approaches an Islamic bank to finance the purchase of digital cartography equipment and geographical information software on a *murabaha* basis. The bank sells the equipment to the school for a total price of USD 63,184 (cost of equipment is USD 60,000) to be paid in 24 monthly installments of USD 2,216 after deducting a down payment for the amount of USD 10,000. By charging a markup of USD 3,184, the bank expects to earn an annual rate of return of 6 percent.

Suppose a commercial bank offers the school a USD 50,000 amortized loan at 6 percent interest to be paid in 24 equal monthly installments of USD 2,216. Does this mean that both the murabaha and the amortized loan are equally attractive to the school and that both the Islamic bank and the commercial bank face the same risk exposure? The answer is no, since in the case of murabaha, the monthly payment is used to reduce the remaining balance due on the equipment purchased; whereas in the case of a loan, only a part of the monthly installment is used to repay the principal while the other part is used to pay interest on the loan. Thus, the school will only find the two alternatives equally attractive if installment payments are paid in full and on time.⁵⁸ The loan is a more attractive alternative if the school decides to prepay the debt or extend its maturity and less attractive in the case of late payment or default. On the other hand, the murabaha is a more attractive alternative if the bank can get a discount from the supplier.

Prepayment: If at any time the school decides to prepay the debt, it is exposed to the risk of settling a larger murabaha balance relative to the loan balance even though the respective monthly installments are identical. This is because the profit mark-up which is an integral part of the murabaha purchasing price constitutes the equivalent of the total interest charged by the commercial bank over the period of

⁵⁸ Equally attractive from a financial perspective even if they are not from a Sharia perspective.

24 months. Thus, the school would have owed USD 38,056 to a commercial bank at the beginning of the seventh month compared to owing USD 39,888 to the Islamic bank – a difference of USD 1,832.

Although the Islamic bank is under no contractual obligation to grant the school a rebate for early payments, it is entirely within its discretion to give the rebate. If the bank decides to give a full rebate, the school will settle the debt by paying the same amount it would have owed the commercial bank: \$38,056. On the other hand, the school will have paid an increment of \$1,832 if the Islamic bank refuses to give any rebate. The incremental difference between the two financing schemes decreases and approaches zero the facility gets closer to maturity.

Discount: Suppose the bank received a 5% discount from the supplier and passed it to the customer in the form of reducing the cost of sale. As a result,

- The customer will pay a monthly installment of only USD 2,091 (vs. USD 2,216 required by the conventional bank).
- The Islamic bank will earn a higher rate of return of 6.3% relative to the one charged by the conventional banks (6%).
- In the event of prepayment, the school will be settling a smaller murabaha balance relative to the loan balance even when the bank refuses to grant rebates for early payments. Exhibit 3.1 shows the prepayment savings that the customer will be making from a murabaha versus a loan.

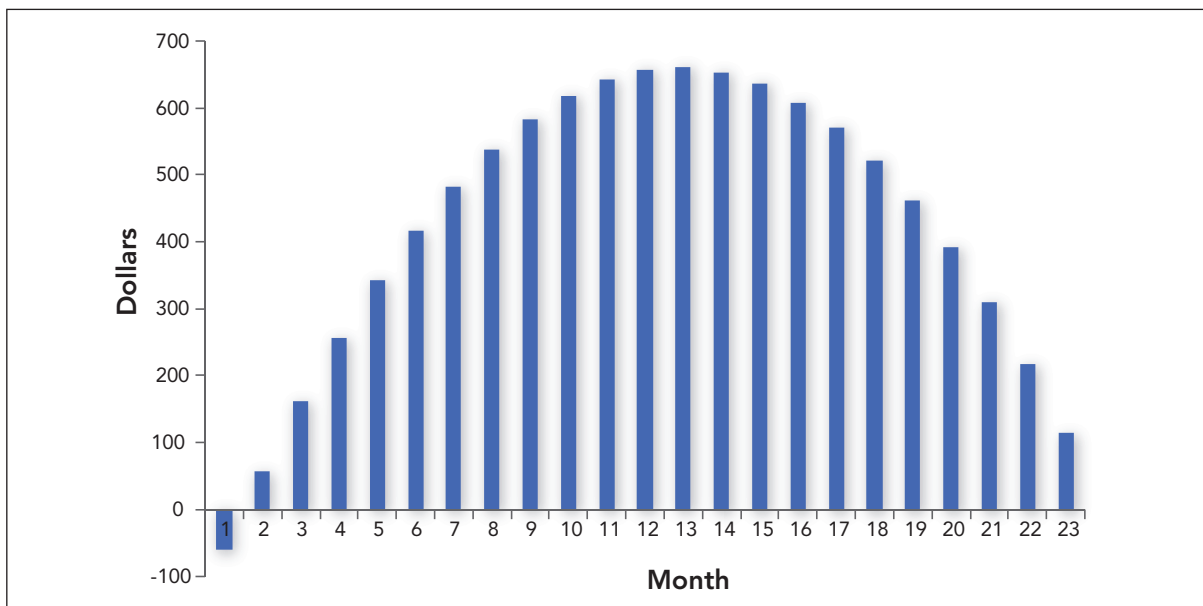


Figure 3.1 Murabaha Prepayment Savings

Late Payment: Although the Islamic bank can impose a penalty fee for late payments, it cannot recognize it as income but can only donate it to charity. As a result, the bank will have a lower rate of return than its conventional counterpart under similar circumstances. Suppose the school was late paying month 6 installment and so was forced to make two payments in month 7. In this case, even if

3. Risk Identification - Murabaha

the bank charges an interest rate of 6 percent for late payments, only USD 4,432 out of the USD 4,443 paid in month 7 is recognized as income while the difference of USD 11 is given to charity.

Restructuring the Debt: Assume that after one year the school faced financial hardship and was considering restructuring the debt by extending its maturity by 12 months. Since murabaha is a sale contract, the bank cannot roll over the debt by using a second MPO. It can only extend maturity without charging any return over the remaining period. In this case, the balance of USD 26,592 owed by the school at the end of the first year will be divided into 24 equal monthly installments of USD 1,108. Conventional banks on the other hand can charge interest as a condition for extending the maturity of the loan. In this case, the monthly installment would amount to USD 1,140, leaving the conventional bank with an annual rate of return of 6 percent in comparison to an annual rate of return of only 4.8 percent for the Islamic bank.

Market Risk

4.1 What is Market Risk?

Market risk is the risk of losses arising from market prices fluctuations. It is present in murabaha transactions in the form of commodity risk, foreign exchange risk, and equity risk. In a non-binding murabaha, the customer has the option to renege on his promise. If he does, and the bank is unable to return the murabaha object of sale to the original supplier, the bank will be forced to find another buyer to get dispose of “undesired inventory.” As a result, the bank can suffer losses if it is forced to sell at a discount. For example, the bank could lose USD 10,000 if immediately after purchasing 10,000 tons of wheat prices drop by one dollar and the customer refuses to fulfill his promise. The bank can still be exposed to a foreign exchange risk even if the customer fulfills his promise. This could happen when the bank pays the supplier in dollars while pricing the murabaha in local currency.

4.2 Value at Risk

Value at Risk (VaR) is a popular and widely used risk measure among risk managers. It is a statistical measure of potential loss in value due to adverse “normal” market movements. VaR is a function of two parameters: the target horizon and the confidence level. Using a confidence level of $(1-\alpha)$ percent and a time horizon of T days, VaR summarizes the maximum loss that a financial institution can suffer $(1-\alpha)$ percent of the time over a T -day holding period, assuming that conditions in future replicate those in the past. In other words, only α percent of the time are losses expected to exceed VaR (Figure 4.1).

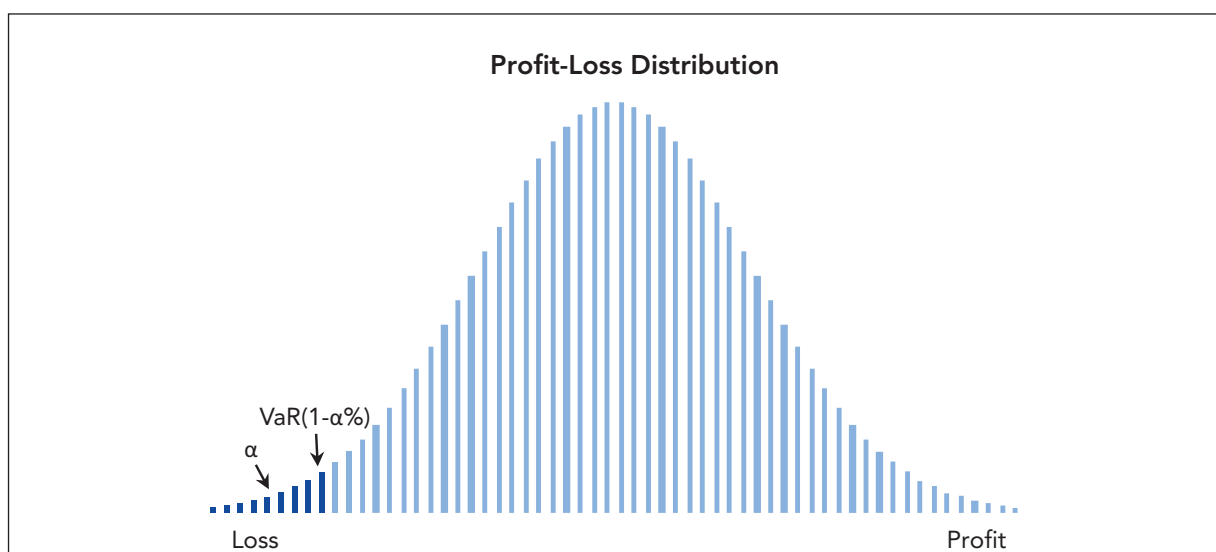


Figure 4.1 Parametric Value at Risk

Consider, for example, a Malaysian bank that holds a USD 10 million FX position. How much could the bank lose over a 1-day holding period with a 99% level of confidence? The first step required for the calculation of VaR is to determine the bank's exposure to market risk or, in this case, the market value of the FX position in Ringgit. The next step is to estimate the variability of the risk factor using the standard deviation of returns on the MYR/USD exchange rate. Suppose that returns are normally distributed with a daily standard deviation of 0.408% and that the exchange rate at the time of calculating VaR is 3.23MYR/USD.⁵⁹ It follows that VaR with a confidence level of 99% and 1-day holding period is MYR 307,057.

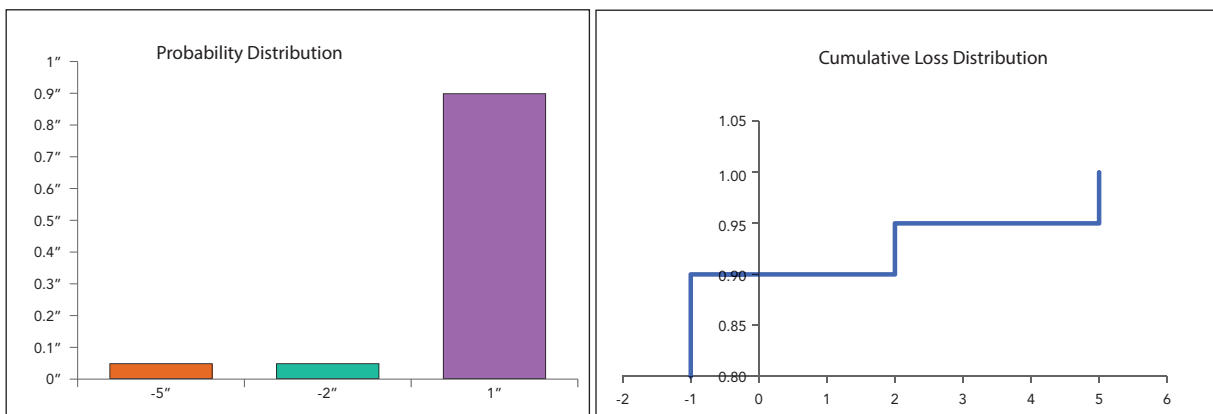
$$\text{VaR} = \text{Exposure} \times \text{volatility} \times q\text{-quantile of P\&L distribution}$$

$$\text{VaR} = (3.23 \times 10,000,000) \times 0.408\% \times 2.33 = \text{MYR}307,057$$

In other words, there is a 99% chance that losses will not exceed MYR307,057 over the next day.

4.2.1 Lower α -VaR and Upper α -VaR

One needs to differentiate between VaR_α and VaR^α : The lower α -VaR is the minimum loss of $\alpha\%$ worst outcomes while the upper α -VaR is the maximum loss of the $(1-\alpha\%)$ best outcomes. Both VaRs coincide for continuous probability distributions but they can assume different values for particular discrete distributions.^{60,61} Consider, for example, that an investment has a 5% chance of a loss of \$5 million, a 5% chance of a loss of \$2 million and a 90% chance of a gain of \$1 million. In this particular case, the loss that corresponds to a cumulative probability of 95% is not a single point but a line segment whose end points correspond to losses of \$2million and \$5million respectively. Consequently, $\text{VaR}_{5\%} = \$5\text{million} \neq \text{VaR}^{5\%} = \2million .



⁵⁹ In this example, we assume that the average of daily FX changes is negligible.

⁶⁰ The use of VaR^α in these particular cases may lead risk managers to underestimate market risk.

⁶¹ See Acerbi C. and Tasche Dirk, Expected Shortfall, A Natural Coherent Alternative to Value at Risk, Economic Notes, Volume 31, Issue 2, pages 379-388, July 2002.

4.2.2 Choice of Parameters

The choice of both the confidence level and the target horizon depends on the purpose for which VaR is used. However, some institutions prefer to use a range of confidence levels and time horizons. In general, a higher (lower) confidence level will increase (decrease) VaR. Likewise; a longer (shorter) time horizon will increase (decrease) VaR.

To illustrate, suppose a Bahraini bank invests BHD 20 million in a particular commodity and wants to know its potential loss over the next 24 hours under normal conditions. If commodity returns are normally distributed with a mean of 0% and a standard deviation of 2%, then VaR at a 95% confidence level and over a holding period of 1 day is estimated at BHD 658,000.⁶² In other words, there is a 5% chance that the bank may lose at least BHD 658,000 over the next day. Now suppose we want to calculate a 99% confidence level VaR using the same inputs. Since returns are assumed to be normally distributed, we can transform the 95% VaR into a 99% VaR using the following formula:⁶³

$$99\% \text{ VaR} = 95\% \text{ VaR} \times [z(99\%) / z(95\%)]$$

In this case, the corresponding VaR is BHD 932,000.⁶⁴ This means that, on average, only 1 day in 100 would the bank expect to lose more than BHD 932,000 due to adverse market movements. On the other hand, assuming that the returns are independently identically distributed, we can use the following conversion rule to estimate VaR over different time horizons:

$$T\text{-day VaR} = 1\text{-day VaR} \times \sqrt{T}$$

For example, a 10-day 95% VaR would equal to about BHD 2.081 million ($658,000 \times \sqrt{10}$). Therefore, given that the risk factors are Gaussian identically independently distributed, the Bahraini bank can convert its one-day 95% VaR into an equivalent regulatory 10-day 99% VaR as follows:

$$10\text{-day } 99\% \text{ VaR} = 1\text{-day } 95\% \text{ VaR} \times (2.33/1.645) \times \sqrt{10} = \text{BHD } 2.95 \text{ million.}^{65}$$

	95%	99%
One-day	BHD 658,000	BHD 932,000
10-day	BHD 2,081,000	BHD 2,947,000

4.2.2.1 Confidence Level

Banks are not required to use any particular confidence level for the measurement of market risk across asset classes. Although the choice is arbitrary, banks commonly use a confidence level between 95% and 99%. On the other hand, a confidence level of 99% or higher is required to capture tail risk but a lower confidence level is more desirable for setting VaR-based position limits. The choice of confidence level should reflect the degree of risk aversion when VaR is used to set capital. The higher the degree of

⁶² $\text{VaR} = 20\text{million} \times 2\% \times 1.645 = 658,000$

⁶³ $z(p\%)$ is the p^{th} percentile of a standard normal distribution.

⁶⁴ $\text{VaR} = 658,000 \times (2.33/1.645)$

⁶⁵ In this particular case, the 10-day 99% VaR used as a standard by the Basel Committee is almost 4.5 times larger than the 1-day 95% VaR adopted by RiskMetrics.

risk aversion, the larger the capital needed to cover potential losses and the higher the confidence level used to calculate VaR. Finally, for backtesting, the confidence level should be set on the basis of the predicting power of the VaR model.

Example 4.1 A Credit Rating Target

Suppose that an Islamic bank is using VaR to set capital on the basis of a target credit rating. If a credit rating of A corresponds to 0.1% chance of defaulting over the next year, then the bank should carry enough capital to cover its one year 99.9% VaR across all exposures⁶⁶. On the other hand, the bank should hold a greater amount of capital to cover the 99.75% VaR if it is targeting a BBB credit rating.⁶⁷

4.2.2.2 Holding Period

The choice of the length of the holding period depends on the nature of the investment the bank is undertaking, reporting horizons and regulatory requirements. Target horizons are usually one day, ten days and one month but can be much longer.⁶⁸ The target period is usually one day for actively traded liquid portfolios but much longer for passively managed portfolios. For illiquid portfolios, the holding period is a function of the time needed to liquidate positions at a reasonable cost. The Basel Committee specifies a holding period of 10 business days for the calculation of regulatory capital but allows banks to use the conversion rule to scale VaR from 1-day into 10-days. However, a 1-day horizon is required for backtesting to increase the prediction power of the test.⁶⁹

4.2.3 VaR Application: Optimal Size of Earnest Payment

One of the key issues in *murabaha* is how to determine the amount of earnest payment. Earnest money can help reduce the risk that a bank will suffer losses if a customer breaks a binding promise. The customer may still refuse to fulfill his obligation if the cost of compliance outweighs the cost of breaking a promise. Accordingly, the bank must ensure that the security deposit is sufficient to compensate for potential losses that could arise from the breach of agreement but not so excessive that the *murabaha* transaction becomes less attractive to the client.

The VaR approach can be used to calculate the size of security deposit required for particular *murabaha* transactions provided that market conditions are “normal”. Consider, for example, a 1-year MPO contract for the purchase of one million pounds of cotton. The Islamic bank in this case will have to buy one million pounds of cotton from a foreign supplier at the market price of 80.00 U.S. cents per pound to resell it to a local cotton fiber manufacturer for the price of 85 cents per pound (cost plus markup). There is always a chance, however small, that the manufacturer reneges on his promise to buy

⁶⁶ The 99.9% confidence level is calculated as 100 minus the corresponding default rate for an A credit rating.

⁶⁷ This is assuming that a BBB credit rating corresponds to 0.25% chance of defaulting over the next year.

⁶⁸ A horizon of one year or longer is usually used for calculating creditVaR.

⁶⁹ The number of observations increases from 26 to 252 when using a 1-day horizon instead of a 10-day horizon.

the cotton from the bank. The bank could potentially suffer losses if it is forced to get rid of “undesired inventory” when market conditions are not favorable.

Such situations arise when there is a large drop in the price of cotton.⁷⁰ The longer the time interval between signing both the promise agreement and the MPO contract, the higher the price volatility and the greater the bank exposure. Assume that it takes about a month from the time the bank places the order to the time it takes constructive possession of the cotton.⁷¹ If monthly cotton returns are normally distributed with a mean of 0% and a standard deviation of 7.1%, then 95%-VaR is USD 93,436.⁷² This is the equivalent of 11.7% of the total amount the bank pays for acquiring cotton. Hence, by requiring a security deposit of about 12 percent, the bank will fully protect itself against such losses 95% of the time.

Suppose the bank requires a 15 percent earnest payment. In this particular case, the bank would expect to fully recover losses about 98.3% of the time. Looked at another way, only about 1.7% of the time would losses exceed the security deposit. However, sometimes the bank is forced to hold the undesired inventory for a longer than the expected period of time. This could be the result of shipment delays and/or difficulties encountered in liquidating the commodity in a timely manner. For longer holding periods, it is less likely that losses would be fully recovered unless the bank requires a higher earnest payment.

Figure 4.2 summarizes earnest money requirements over different holding periods and for different confidence levels. Suppose we are interested in estimating earnest money using a confidence level of 95%. Figure 4.2 reveals that a rate of 11.7% will be sufficient to cover losses when the holding period is one month. However, a higher security deposit is needed (16.5%) if the bank expects a longer time horizon (two months).

	90%	95%	99%
One month	9.1	11.7	16.5
One and a half month	11.1	14.3	20.2
Two months	12.9	16.5	23.3

Figure 4.2 Security Deposit for Different CL and Horizons

Alternatively, we may be interested in determining the likelihood of recovering losses. For instance, what is the likelihood that the bank would recover losses if it required a security deposit of about 10%? Note that for a given security deposit, the bank is more likely to recover losses over shorter holding periods (Figure 4.3). In this particular case, there is a 92.1% chance of recovering losses provided that the undesired inventory is liquidated in a timely manner (one month time horizon). However, there is only an 84% chance if the commodity is held over a period of two months. In other words, bank losses would exceed the security deposit about 16% of the time.

⁷⁰ We are assuming in this case that the local currency is pegged to the dollar, so we are dealing with a single risk factor.

⁷¹ Most LC managers would say that the time it takes from opening an LC to receiving the bill of lading varies from a couple of weeks to several months – depending on the nature of the goods and on suppliers. The average time interval is about 4-6 weeks.

⁷² $\text{VaR}(95\%) = 1 \text{ million pounds} \times 80 \text{ cents} \times 7.1\% \times 1.645 = \text{USD}93,436$

	10%	15%	20%
One month	92.1	98.3	99.8
One and a half month	87.5	95.8	98.9
Two months	84.0	93.2	97.7

Figure 4.3 Security Deposit for Different CL and Horizons

4.2.4 Limitations of VaR

Despite its widespread popularity as a measure of risk, VaR has been criticized on two grounds: failure to account for rare events (tail risk) and failure to satisfy coherency.

4.2.4.1 Tail Risk

Tail risk is the risk that rare events occur more frequently than a normal curve would predict. The likelihood that “normal” returns deviate from the mean by more than 3 standard deviations is almost nil (0.27%). In reality however, large negative returns are not as rare as one would expect. Consider, for example, daily movements of Dubai Financial Market index (DFM) over the period December 1, 2005 to December 31, 2013. For this particular time interval, the distribution of daily percentage changes is symmetric (skewness of -0.121) but fat-tailed (kurtosis of 5.69); the mean and standard deviation are -0.065% and 1.86% respectively. Daily movements that deviate by more than 3 standard deviations occurred much more frequently than depicted by a normal distribution (2.04%). If daily percentage changes are “normal,” one would expect the DFM index to fall by -7.5% or more (4-sigma) only once every 124 years.⁷³ Instead, the index lost more than 7.5% of its value seven times in the past 8 years!

Moreover, the index increased by 7.5% or more thirteen times since 2006 and on six of these occasions the index rose by 9% or more (about 4.9-sigma). Statistically, if returns are ‘normal’ a 4.9-sigma event should happen no more than once every 8,216 years!

	DFM Index		Normal Distribution	
	Probability (%)	Odds	Probability (%)	Odds
>1-Sigma	20.10	4:1	31.73	2:1
>2-Sigma	5.40	18:1	4.55	22:1
>3-Sigma	2.04	48:1	0.27	369:1
>4-Sigma	0.92	107:1	0.01	15786:1
>5-Sigma	0.29	341:1	0.00	1,744,274:1
>6-Sigma	0.05	2054:1	0.00	506,797,163:1

Figure 4.4 Frequency of Rare Events Actual vs. Normal Distribution Depiction

⁷³ The average number of trading days per year is 254.

It should be clear from Figure 4.4 that a shortcoming of parametric VaR is that it underestimates downside risk and overestimates upside potential when return distribution is not ‘normal’ but fat-tailed.

Example 4.2 Shares Murabaha Financing

Suppose an Islamic bank provides its customers with the opportunity to invest in a Sharia-compliant mutual fund that seeks to track the DFM index. The bank offers to sell the shares at an agreed profit (murabaha) and repayment plan⁷⁴. Using historical daily movements of the DFM index and making the assumption that daily movements follow a normal distribution, the fund manager calculates the 1-day 95% VaR and 99% VaR at -3.71 and -4.81 percent respectively⁷⁵. Clearly, this is an underestimation of the true downside risk (-4.73% and -7% respectively). Therefore, an investor who put AED 100,000 into the Sharia-fund should expect a loss of AED 7,000 or more about once a year. This is significantly higher than the AED 4,810 predicted by the fund manager. Accordingly, a client who enters into a murabaha to increase the amount of shares purchased (use of leverage) is potentially subjected to a far greater loss than expected.

By definition, VaR only measures the $(1-\alpha)$ quantile of the loss function. It disregards the size and frequency of losses in the tail beyond the VaR level. As such, murabaha facilities of different risk profiles can still have equal VaR estimates. For example, consider two murabaha facilities ABC and XYZ with the following payoff profiles at the end of the holding period:

Murabaha ABC		Murabaha XYZ	
Returns	Probability	Returns	Probability
\$-30 million	5%	\$-50 million	2%
\$+5 million	95%	\$-30 million	3%
		\$+5 million	95%

Despite having different tail risks, both murabaha ABC and XYZ have equal VaRs at 95% confidence level.

$$VaR_{5\%}(ABC) = VaR_{5\%}(XYZ) = 30\$$$

$$VaR^{5\%}(ABC) = VaR^{5\%}(XYZ) = -5\$$$

This trivial example reveals VaR's insensitivity to tail risk. By using VaR as a measure of risk exposure, one may conclude that murabaha ABC and XYZ are both equally risky although murabaha XYZ has a much higher downside risk.

⁷⁴ Many Islamic banks provide the investor with the option to sell the acquired shares at anytime. In this case, banks are subject to a greater credit risk, especially when a security check is the only security required against default.

⁷⁵ VaR (95%) = $-0.065\% - 1.96 \times 1.84\% = -3.71\%$ and VaR (99%) = $-0.065\% - 2.58 \times 1.84\% = -4.81\%$

4.2.4.2 Coherent Measure of Risk

A risk measure ρ is “coherent” if it satisfies the following set of axioms:⁷⁶

Monotonicity: X is riskier than Y if it has worse outcomes for every state of the world: $\rho(X) \geq \rho(Y)$ for $X \leq Y$

Positively homogenous: The risk of a position is proportional to its size; e.g. doubling the investment will double the risk:⁷⁷ $\rho(\lambda X) = \lambda \rho(X)$ for $\lambda > 0$

Translational invariant: Adding an amount of cash α to a position X should reduce risk by an equal amount α : $\rho(X + \alpha) = \rho(X) - \alpha$

Sub-additive: Holding a portfolio of X and Y should yield no greater of a risk than the sum of the individual risks of X and Y; diversification helps reduce risk: $\rho(X + Y) \leq \rho(X) + \rho(Y)$

VaR satisfies the first three conditions of a coherent risk measure. However, it violates sub-additivity when the loss distributions are non-elliptical. Consider two identical murabaha transactions with the following payoff profile in case the client reneges on his promise:

Murabaha ABC		Murabaha XYZ	
Loss (QR)	Probability	Loss (QR)	Probability
-30,000	3%	-30,000	3%
-2,000	97%	-2,000	97%
VaR (95%) = -2,000		VaR (95%) = -2,000	

QR: Qatari Ryal

The probability that the bank loses QR 30,000 is 3% and the probability that it loses QR 2,000 is 97%. The total 95% VaR of the two identical murabaha considered separately is QR 4,000. Now suppose that the two murabaha transactions are independent and that they form a single portfolio with the following payoff distribution:

Loss (QR)	Probability
-60,000	0.09%
-32,000	5.82%
-4,000	94.09%
VaR (95%) = -32,000	

When the two identical transactions are combined in one portfolio, the probability that the bank loses QR60,000 is 0.09% (0.03×0.03), the probability that it loses QR 32,000 is 5.82% ($2 \times 0.03 \times 0.97$) and the probability that it loses QR 4,000 is 94.09% (0.97×0.97). The 95% VaR of the portfolio is QR 32,000

⁷⁶ See Atzner P., Delbaen F. and Heath D., *Coherent Measures of Risk*, Mathematical Finance, Volume 9, Issue 3, pages 203-228, July 1999.

⁷⁷ Provided that the size of the portfolio does not influence the risk.

which suggests that diversification increases risk! This violates the sub-additivity property of a coherent risk measure: aggregating individual risks should not increase the overall risk. Thus, VaR is not in general a coherent measure of risk.

4.3 Expected Shortfall

Also referred to as conditional VaR (CVaR), expected shortfall (ES) measures the average loss in the $\alpha\%$ worst cases. For a discrete loss distribution, the expected shortfall is defined as the weighted average of the worst 100 $\alpha\%$ of losses.

$$ES = \frac{1}{\alpha} \sum_{L > q_{\alpha}} L \times f(L)$$

where L represents Loss, $f(L)$ is the probability function of L and q_{α} is the α -quantile. Consider the following example: A risk analyst uses the bank's historical data to estimate the loss distribution of a murabaha transaction in the event of a promise break.

Frequency	0.03	0.06	0.11	0.17	0.22	0.28	0.13
Loss (%)	100%	75%	50%	25%	15%	5%	0%

Out of every 100 promises broken, only three resulted in a total loss whereas 28 led to a loss of only 5%. On the other hand, no losses were reported in 13% of the cases. On the basis of the information provided, what is the expected loss of the 10% worst cases?

$$ES = \frac{(0.01 \times 50\% + 0.06 \times 75\% + 0.03 \times 100\%)}{0.1} = 80\%$$

Conditional on being in the 10% tail of the loss distribution, there is 10% chance of losing 50%, 60 percent chance of losing 75% and 30 percent chance of a total loss. Therefore, the expected shortfall is equal to 80%: a much higher value than the 90%VaR (a maximum loss of 50% in 90 out of every 100 promises broken).

Example 4.3 Sukuk Commodity Murabaha

Suppose that a Malaysian Islamic bank is holding a 1-year A-rated sukuk murabaha.⁷⁸ The sukuk has two possible payoffs: a 5% return on the face value of RM100 if there is no default⁷⁹ and a recovery rate of 40 percent in case of default.⁷⁹ The probability of default of an A-rated sukuk is estimated at 3%. A 95% value at risk in this case, amounts to RM-5. In other words, 95% of the time, the bank will not lose money but will instead make a profit of RM5. But how much should the bank expect to lose in the 5% worst cases?

⁷⁸ The sale of debt is permissible in Malaysia. Accordingly, Murabaha sukuk have become a very popular alternative to bonds.

⁷⁹ The recovery rate is the percentage of the face value that will be repaid back in the case of default.

$$ES = \frac{(0.02 \times -5 + 0.03 \times 60)}{0.05} = \text{RM}34$$

Conditional on the 5% worst cases, there is a 40% chance of making a profit of RM5 and a 60% chance of losing RM60. Therefore, the bank expects to lose on average RM34 5% of the time. In this particular case, because the loss is beyond the 95% threshold, ES is by far better than VaR at capturing risk.

The expected shortfall of a normally distributed loss function is defined as the expected loss conditional on the loss exceeding VaR.

$$ES_{\alpha} = E(\text{Loss} | \text{Loss} > \text{VaR}_{\alpha}) = \frac{1}{\alpha} \int_{-\infty}^{\text{VaR}_{\alpha}} L f(L) dL$$

It is measured by the average value of the loss in the tail (Figure 4.5).

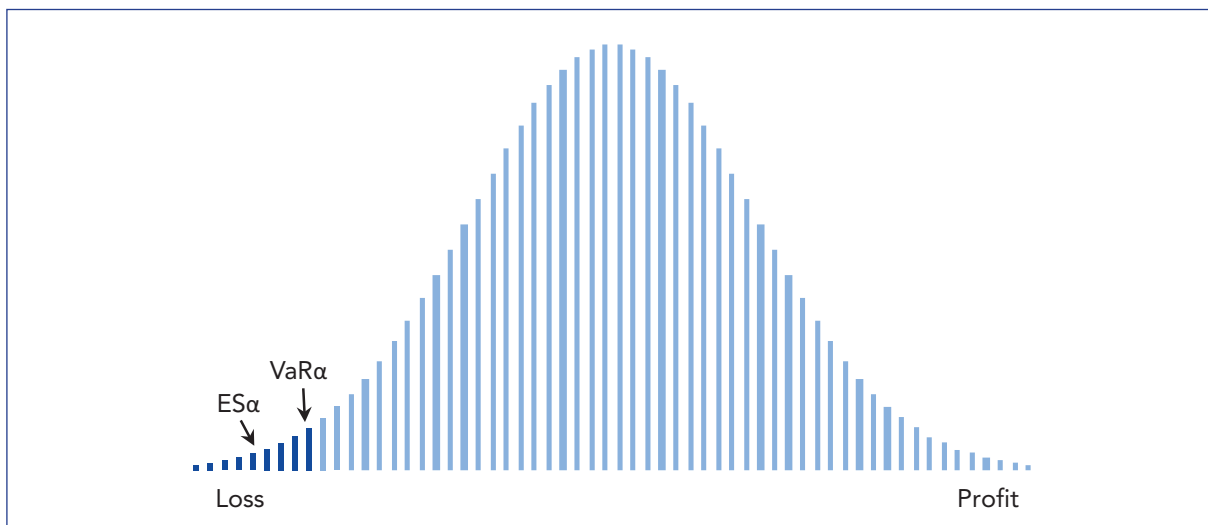


Figure 4.5 Expected Shortfall

For continuous loss distributions, ES is sensitive to the shape of the loss distribution in the tail. The fatter the tail, the larger ES is.

Example 4.4 Optimal Size of Earnest Payment Revisited

In a previous example, we found that the 95% VaR amounts to 11.7% when monthly cotton returns are normally distributed with a mean of 0% and a standard deviation of 7.1%. In other words, 95% of the time, the maximum that the bank expects to lose is about 11.7% of the cost of acquiring cotton. However, there is a 5% chance that bank losses will exceed 11.7%. In this case, the expected loss conditional on loss exceeding VaR is 14.6%.

$$ES = \frac{1}{\alpha} \int_{-\infty}^{VaR} l \times \frac{1}{(2 \times \pi)^{1/2} \times \sigma} \times e^{\left[-\frac{1}{2} \times \left(\frac{l - \mu}{\sigma} \right)^2 \right]} dl$$

$$ES = \frac{1}{0.05} \int_{-\infty}^{VaR} l \times \frac{1}{(2 \times \pi)^{1/2} \times 0.071} \times e^{\left[-\frac{1}{2} \times \left(\frac{l - 0}{0.071} \right)^2 \right]} dl = -0.14$$

4.3.1 Coherent Measure of Risk

The same example that was used previously to show that VaR violates the sub-additivity property of a coherent risk measure will be used here to show that ES satisfies the sub-additivity axiom. Consider two identical murabaha transactions with the following payoff profile in case the client reneges on his promise:

Murabaha ABC		Murabaha XYZ	
Loss (QR)	Probability	Loss (QR)	Probability
-30,000	3%	-30,000	3%
-2,000	97%	-2,000	97%
ES = -18,800		ES = -18,800	

QR: Qatari Riyal

Out of the 5% worst losses, the bank expects to lose QR 2,000 forty percent of the time and QR 30,000 sixty percent of the time. Therefore, the expected loss of the 5% worst losses for each of the two identical murabahas amounts to QR 18,800. Now suppose that the two murabaha transactions are independent and that they form a single portfolio with the following payoff distribution:

Loss (QR)	Probability
-60,000	0.09%
-32,000	5.82%
-4,000	94.09%
ES = -31,928	

Since $ES(ABC) + ES(XYZ) > ES(ABC + XYZ)$, expected shortfall satisfies the sub-additivity property of a coherent measure of risk. Diversification decreases risk.

Because ES is a coherent measure of risk that captures the tail risk, the Basel III Accord requires that banks use a 97.5% ES as an alternative to VaR for the internal models-based approach.⁸⁰

⁸⁰ See Basel Committee on Banking Supervision, *Consultative Document: Fundamental Review of the Trading Book: A Revised Market Risk Framework* (October 2013).

4.4 Extreme Value Theory

Suppose that a risk manager of an Islamic bank has been asked to assess the market risk of a cotton murabaha contract. On the basis of cotton yearly prices (March data) from 2001 through 2010, how could the risk manager calculate that the price of a certain type of cotton will reach 197.86 cents per pound by March 2011?⁸¹

Year	Price	Year	Price
2001	48.93	2006	52.29
2002	34.57	2007	51.39
2003	56.33	2008	71.29
2004	63.64	2009	40.47
2005	51.05	2010	76.83

Rare costly events are a major concern for risk managers. The challenge risk officers confront is how to extrapolate unobserved extreme events from a relatively small sample of low frequency high severity losses. The extreme value theory (EVT) allows us to model the asymptotical distribution of rare losses in the tail. The two basic approaches for the identification of extreme values are the *block maxima* and the *Peaks-over-Threshold* (POT).

The *Block maxima* method consists of dividing the series into equal length blocks and selecting the maximum observation within each block (a so-called block maximum). The blue columns in the left panel of Figure 4.6 constitute the block maxima of monthly prices of cotton over a period of five years.⁸² The aim of this method is to model the distribution of extreme events or block maxima and then estimate the risk measure of interest (VaR or ES).

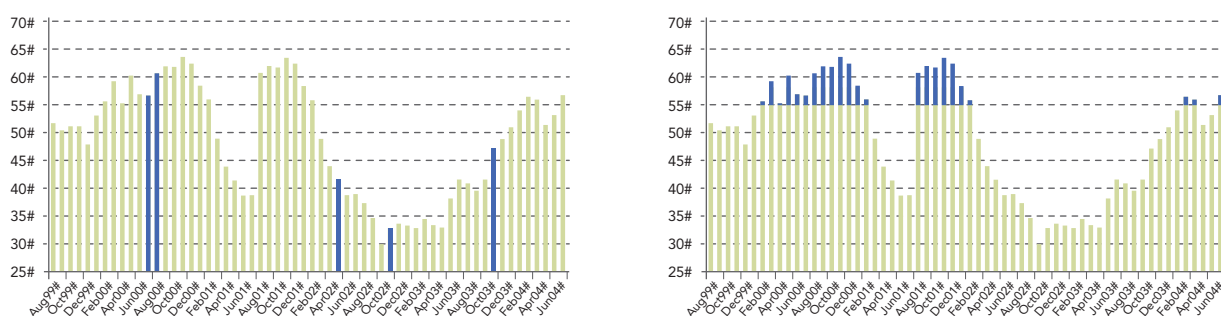


Figure 4.6 Block maxima and Peaks-over-Threshold.

The *Peak-over-Threshold* approach, on the other hand, focuses on the distribution of observations that exceed a given high threshold. The blue columns in the right panel of Figure 4.6 represent threshold

⁸¹ We will use this particular example when addressing salam contracts to show the extent of loss that a bank may incur in the case of a spike in prices.

⁸² Data represent monthly cotton prices over the period August 1999 to July 2004. The marketing year of cotton is from August through the following July.

exceedances for the underlying series. This method is most useful to practitioners when faced with scarce data on extreme outcomes.

4.4.1 Generalized Extreme-Value Distribution

Consider that losses are characterized by the sequence X_1, X_2, \dots, X_n of independent and identically distributed (iid) random variables from some unknown distribution and let $M_n = \max(X_1, X_2, \dots, X_n)$ represent block maxima. As n gets large, the distribution of M_n converges to the following generalized extreme value (GEV) distribution:

$$H_{\xi, \mu, \sigma}(x) = \begin{cases} \exp \left[- \left(1 + \xi \frac{x - \mu}{\sigma} \right)^{-1/\xi} \right] & \text{if } \xi \neq 0 \\ \exp \left(- \exp \frac{x - \mu}{\sigma} \right) & \text{if } \xi = 0 \end{cases}$$

The GEV distribution has three parameters: the location parameter μ , the scale parameter σ , and the shape parameter ξ , which indicates the heaviness of the tail of the distribution. The larger the value of ξ , the fatter the tail. Depending on the value of ξ , the standardized H_{ξ} can take one of three possible forms of extreme value distributions:

Fréchet distribution ($\xi > 0$) – Fat-tailed⁸³

$$H_{\xi}(x) = \exp(-x^{-1/\xi})$$

Gumbel distribution ($\xi = 0$) – Exponentially decaying tails

$$H_{\xi}(x) = \exp[-\exp(-x)]$$

Weibull distribution ($\xi < 0$) – Short-tailed

$$H_{\xi}(x) = \exp[-(-x)^{1/\xi}]$$

4.4.2 Generalised Pareto Distribution

An alternative modern approach for modeling extreme values is the peak-over-threshold (POT) method. In this particular case, the distribution of observations that exceed a given high threshold u converges to the following generalized Pareto distribution (GPD) as u increases:⁸⁴

$$H_{\xi, \mu, \sigma}(x) = \begin{cases} \exp \left[- \left(1 + \xi \frac{x - \mu}{\sigma} \right)^{-1/\xi} \right] & \text{if } \xi \neq 0 \\ \exp \left(- \exp \frac{x - \mu}{\sigma} \right) & \text{if } \xi = 0 \end{cases}$$

⁸³ The tail of a Fréchet distribution decays like a power function at a rate of $1/\xi$.

⁸⁴ For a random iid loss variable X with distribution function $F(x)$, the distribution of excess losses over a threshold u is given:

$$F_u(x) = P(X - u \leq x | X > u) = \frac{F(x + u) - F(u)}{1 - F(u)}$$

For large values of u , $F_u(x)$ converges to GPD.

The GPD distribution has two parameters: the scale parameter β , and the shape parameter ξ .⁸⁵ The larger the value of ξ , the fatter the tail. The generalized Pareto distribution G_ξ can take one of three possible forms of extreme value distributions:

Pareto type distribution ($\xi > 0$) – Fat-tailed

Exponential distribution ($\xi = 0$) – Light-tailed

Beta type distribution ($\xi < 0$) – Short-tailed

While both approaches can be used to model the distribution of extreme events in the tail, risk practitioners favor the use of the more modern GPD method. Accordingly, we will only describe the steps required for GPD, which can be summarized as follows:

- **Step1:** Analyze the data
- **Step2:** Choose a threshold u
- **Step3:** Estimate the parameters
- **Step4:** Calculate VaR and ES

4.4.2.1 Data Analysis – Q-Q Plot

The first step towards estimating the risk measure of interest is to explore whether the distribution of the data has fat tails. The Q-Q Plot is a very popular graphical method used to assess the “goodness of fit” of a data set to a specified parametric model and to detect outliers. By plotting the sample data quantiles against the standard normal distribution quantiles, one can check for fat tails. To illustrate, we have plotted the quantiles of the DFM index data sample against those of a standard normal distribution (Figure 4.7). If DFM returns were normally distributed, the Q-Q plot would be linear. Notice the departure from linearity in the tails. The dots are farther away from the line at both ends. In other words, the largest gains are larger than expected by the theoretical model. Similarly, the largest losses are larger than expected. As a result, the actual distribution has heavier tails than the normal.

⁸⁵ ξ is positive for most financial data.

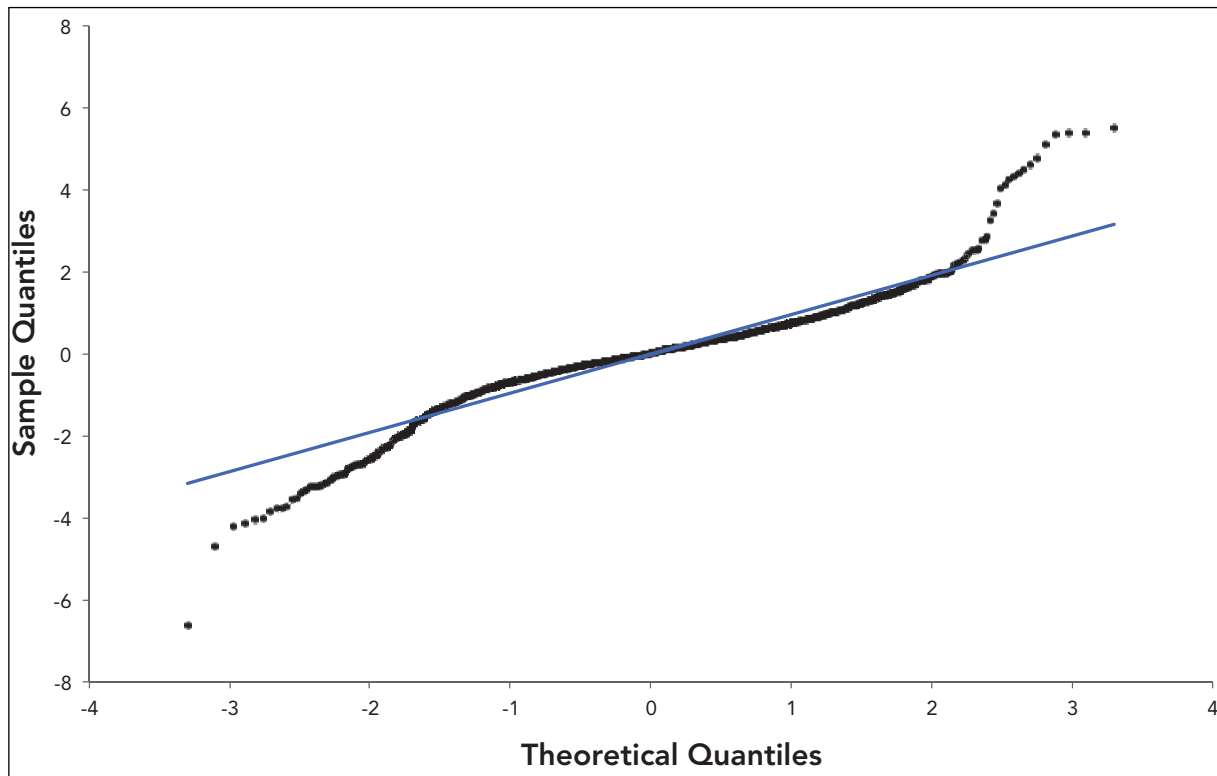


Figure 4.7 Q-Q Plot – DFM Sample Against Normal Distribution

4.4.2.2 Choice of the Threshold u

The shape parameter ξ is sensitive to the choice of u . As a result, different values of u can lead to significantly different estimates of the risk measure (VaR and ES). Despite the importance of carefully choosing u , the choice is not easy. A very large value will result in fewer observations (large variance) and too low a threshold will result in a greater number of observations of which some will not be classified as extreme events (bias). Thus, the challenge is to strike a balance between the bias and the variance of the estimates. A commonly used approach is for u to take a value between the 90th and 95th percentile of the empirical distribution.

4.4.2.3 Estimation of Parameters

Once the threshold u has been chosen and the exceedances extracted, we estimate the two parameters ξ and β . In general, the parameters are estimated by using the maximum likelihood (ML) method.⁸⁶

⁸⁶ Here we are assuming that exceedances are independent and identically distributed. The assumption that exceedances are identically (independently) distributed is violated if the data is seasonal (serially correlated). This problem can be resolved by using stratifying (declustering).

4.4.2.4 Estimating VaR and ES

The final step is to use the estimates of β and ξ and choose a confidence level α to calculate both the value at risk and expected shortfall. The VaR estimate is obtained by inverting the tail estimator.⁸⁷

$$VaR_{\alpha} = u + \frac{\hat{\beta}}{\hat{\xi}} \left[\left(\frac{N}{N_u} (1 - \alpha) \right)^{-\hat{\xi}} - 1 \right]$$

$$ES = \frac{VaR_{\alpha}}{1 - \xi} + \frac{\hat{\beta} - \xi u}{1 - \xi}$$

where N_u is the number of exceedences. Using VaR for the tail distribution will allow us to capture the low frequency high severity losses.

Example 4.5 VaR and ES of the Tail Distribution

Suppose that a risk officer has collected data on daily returns of sukuk murabaha and wants to estimate the 99.5% VaR and ES. He chose a threshold of $u=1.5\%$ and obtained the following estimates: $\beta=0.7$ and $\xi=0.47$ and $N_u/N=1.5\%$. The 99% VaR is 1.81% and the ES is 3.41%.

$$VaR_{\alpha} = 1.5 + \frac{0.7}{0.47} \left[\left(\frac{1}{0.015} (1 - 0.99) \right)^{-0.47} - 1 \right] = 1.81\%$$

$$ES = \frac{1.81}{1 - 0.47} + \frac{0.7 - 0.47 \times 1.5}{1 - 0.47} = 3.41\%$$

4.5 Value at Risk Approaches

The three main approaches that can be used in calculating VaR are the *parametric approach*, the *non-Parametric Historical simulation*, and *Monte Carlo simulation*. Each method has its own merits and drawbacks; there is no single best approach suitable for every situation.

⁸⁷ See Mc Neil A., Frey R., and Embrechts P., *Quantitative Risk Management*, Princeton Series in Finance, 2005.

4.5.1 Parametric Approach

The Parametric approach assumes that the distributions of the risk factors belong to a family of parametric distributions. This approach can produce more accurate and precise estimates of VaR if the assumption is correct but may underestimate or overestimate VaR if the assumption is incorrect.

For normally distributed risk factors, the calculation is simple and fast. One only needs to estimate two parameters from a selected historical data set: the mean and standard deviation. However, before proceeding straight to estimation, the risk manager needs to look for evidence of normality. Preliminary data analysis consists of plotting the quantiles of the empirical distribution against the corresponding quantiles of a standard normal distribution. The Q-Q plot is linear for normally distributed series. Once normality is established, the analyst proceeds to estimate the mean μ and standard deviation σ to calculate VaR.

$$VaR_{\alpha} = -\mu + z_{\alpha} \cdot \sigma \quad (z_{\alpha} > 0)$$

Example 4.6 Parametric VaR

Consider a 1-year MPO contract for the purchase of one million pounds of cotton. The market price is 80 cents per pound. If monthly cotton returns are normally distributed with a mean of 0.661% and a standard deviation of 7.205%, and the bank risk horizon is one month, then 95% VaR is calculated as follows:

$$VaR = -0.00661 + 1.645 \times 0.07205 = 0.1179$$

95% of the time, the bank should expect a loss not exceeding 11.8% or \$94.320.

4.5.2 Nonparametric Approach

Unlike parametric VaR, non-parametric approaches make no specific assumption about the distribution of risk factors. Instead, they use the empirical distribution of historical changes in the values of market variables to estimate VaR based on the assumption that the recent past behavior of the data repeats itself in the near future. The two non-parametric VaR methods used by practitioners are: the *historical simulation* and the *bootstrap simulation*.

4.5.2.1 Historical Simulation

The Historical Simulation method is by far the most popular approach used by banks to estimate VaR.⁸⁸ The simplest of all VaR approaches, it assumes that the distribution of future changes in the values of risk factors replicates the distribution of historical changes. VaR is thus calculated by strictly using a

⁸⁸ A survey conducted by Perignon and Smith (2010) revealed that out of 60 large international banks, 73% reported using Historical Simulation in calculating VaR.
See Perignon, C., Smith, D., (2010), *The level and quality of Value-at-Risk disclosure by commercial banks*, Journal of Banking & Finance 34, 362-377.

sample of past risk factors changes. As such, the accuracy of VaR estimates depends on whether history repeats itself.

Example 4.7 Non-Parametric VaR – Historical Simulation

Let us re-examine the previous example (Example 4.6) to show the steps needed to calculate VaR under the historical simulation approach.

Step1: Identify the risk factors. In this example, monthly cotton returns are the only risk factor.

Step2: Select a sample of historical values of the risk factor. Historical simulation requires data series of considerable length to capture changes in market conditions. In this particular example, the sample consists of monthly cotton returns over the last 140 months. Each of the 140 observations represents an alternative scenario of next period's return.

Date	Scenario Number	Monthly Returns (%)
Dec 2000	1	2.28
Jan 2001	2	-0.86
Feb 2001	3	-1.51
March 2001	4	4.95

May 2013	138	-1.35
June 2013	139	2.84
July 2013	140	-0.67

Step3: Sort the data from the worst scenario to the best scenario or in our case from the lowest return to the highest return.

Scenario Number	Monthly Returns (%)
116	-24.4
83	-18.3
114	-17.8
84	-15.6
126	-13.6
32	-13.3
31	-13.2
117	-9.4
43	-9.2
...	...
...	...
23	16.88
111	20.21

Over the last 140 months, the worst scenario was on July 2011 where the price of cotton fell by about 24.4 percent. The second worst scenario (-18.3%) was recorded on October 2008, and so on.

Step 4: Select a confidence level and estimate VaR. The one-month 95% VaR can be calculated as the seventh worst return (since we have 140 scenarios). This is -13.2% or the equivalent of \$104,863⁸⁹. Note the difference between the estimates of parametric VaR (11.7%) and non-parametric VaR (13.2%). To check whether the maximum loss has been underestimated due to the normality assumption, we plot the quantiles of the data sample against those of a standard normal distribution (Figure 4.8). The departure from linearity in the left tail is an indication that the actual worst losses are larger than expected. In other words, the empirical distribution has a fat left tail. Therefore, the normal distribution is not a good fit for the data.

⁸⁹ Based on a price of cotton in August of 84.8 cents.

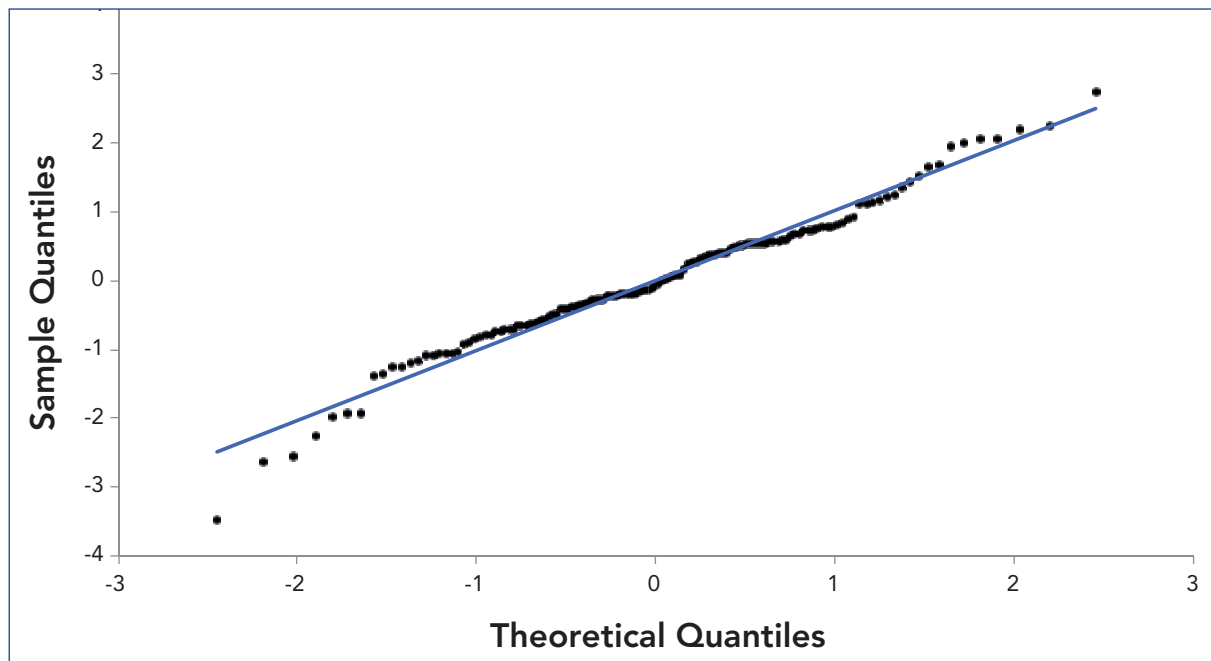


Figure 4.8 Q-Q Plot – Cotton Empirical Distribution Against Normal Distribution

The ease of computation is not confined to VaR but extends to ES as well. In our example, the expected shortfall is directly calculated by taking the average of the worst seven scenarios:

$$ES = (28.4 + 18.3 + 17.8 + 15.6 + 13.6 + 13.3 + 13.2)/7 = 17.17\%$$

The average loss that the bank could encounter in the worst 5% of the time is 17.17 percent.

4.5.2.2 Historical Bootstrap

Historical simulation uses the empirical distribution of a sample of historical values of risk factors to calculate VaR. But since different samples yield different values of VaR, one would like to know the magnitude of the change in VaR when a different sample is selected. One practical, simple but effective way to measure these fluctuations is bootstrapping. This approach allows the drawing of a large number of repeated bootstrap samples of equal size from the observed dataset (sampling with replacement). The value at risk is then calculated for each repeated sample in order to generate a sampling distribution of VaR and to construct the confidence interval.

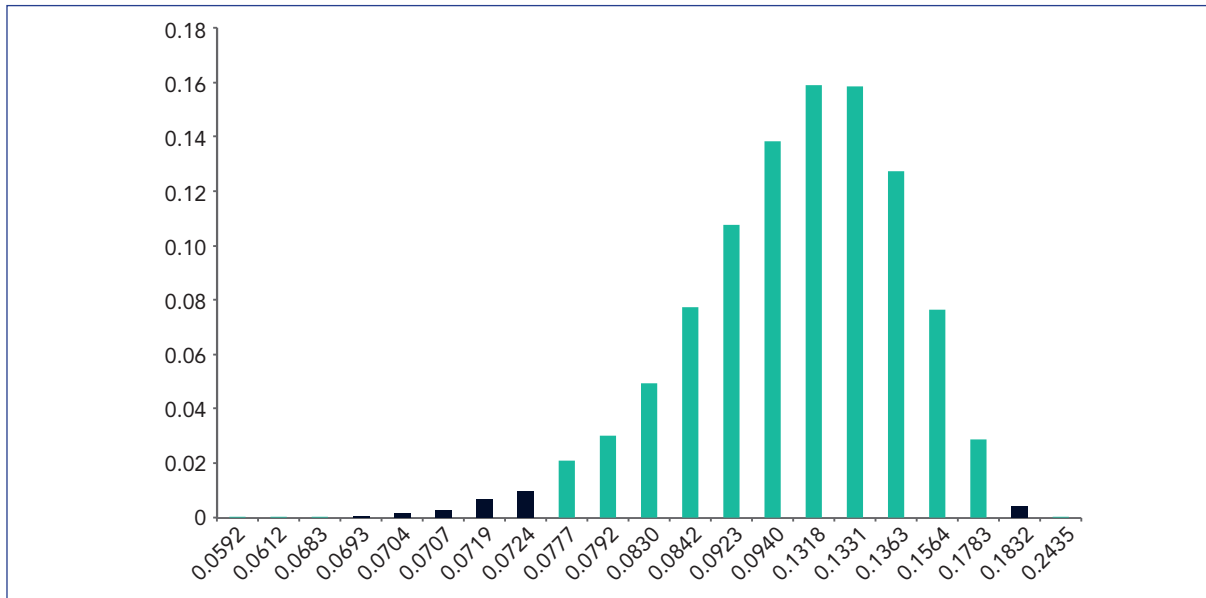
Example 4.8 Non-Parametric VaR – Bootstrapping

In the previous example, we used a sample of 140 observations to calculate VaR (historical simulation approach). Bootstrapping is an extension of the historical simulation method. It requires the following steps:

- Step1:** Take the original sample used in historical simulation as the population from which one simulates drawing samples (with replacement) of size 140.
- Step2:** Draw a random sample with replacement from the original sample. This involves randomly selecting 140 possible scenarios with replacement. In other words, each randomly selected scenario could generate one of the 140 possible historical observations. Therefore, a given scenario could be repeated more than once in the random sample. It is also possible for a given scenario not to be included in the random sample.
- Step3:** Sort the data from the worst scenario to the best scenario and calculate VaR.
- Step4:** Generate a large number of bootstrap samples and repeat step 3 for each sample. A large number of bootstrap samples is needed to construct VaR's confidence interval. Using our example, we repeated the process 10,000 times.

(%)	Sc.1	Sc.2	Sc.3	...	Sc.138	Sc.139	Sc.140	95%VaR
Sample 1	-1.5	-17.8	-0.3	...	3.9	3.3	-3.6	-9.4
Sample 2	4.3	14.7	-8.3	...	15.1	-4.8	14.7	-9.2
Sample 3	-0.7	-0.3	-3.7	...	-24.4	4.2	1.7	-13.2
...
Sample 9,998	4.6	15.4	-13.3	...	-17.8	15.4	3.3	-8.4
Sample 9,999	4.2	6.6	-4.5	...	3.9	2.3	-5.1	-13.2
Sample 10,000	5.5	-0.4	-9.4	...	-2.3	3.6	1.7	-13.2

- Step5:** Calculate VaR for each bootstrap sample then generate the sampling distribution of VaR and construct the 95% confidence interval. Since the 250th largest VaR is 7.8% and the 9,750th largest VaR is 17.8%, the confidence interval in this particular example consists of the range of values between 7.8% and 17.8% inclusive.



Sampling Distribution of VaR

4.5.3 Monte Carlo Simulation

The Monte Carlo simulation involves using a stochastic process to simulate risk factors' behavior. A Monte Carlo simulation encompasses the following steps:

1. **Specify the stochastic process for modeling risk factors:** The geometric Brownian motion (GBM) process is commonly used for modeling risk factors. If an asset price S obeys a GBM stochastic process, then:

$$S_T = S_0 \exp \left(\left[\mu - \frac{1}{2} \sigma^2 \right] T + \sigma W_T \right)$$

or equivalently,

$$\log \left(\frac{S_T}{S_0} \right) = \left(\mu - \frac{1}{2} \sigma^2 \right) T + \sigma W_T$$

where W is a Wiener process, $\mu - \sigma^2/2$ is the deterministic component (drift) and σ is the stochastic component. In this case, S is log-normally distributed and the logarithmic returns are normally distributed.

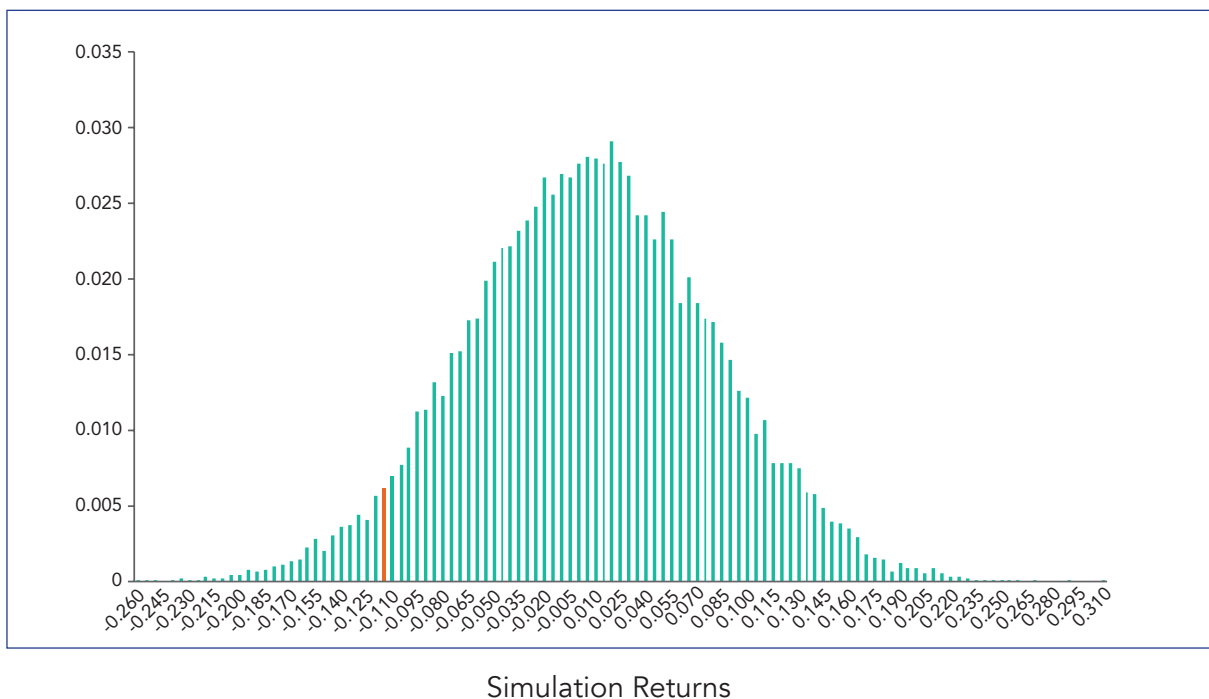
2. **Estimate the input parameters:** Use asset historical data to estimate the mean and standard deviation.
3. **Generate random values of risk factors:** Using the GBM stochastic process, run thousands of simulations in order to generate future returns scenarios. The number of trials should be large enough for the simulated distribution to approximate the 'true' unknown distribution.

4. **Calculate VaR:** Sort the simulated data from the worst scenario to the best scenario, select a confidence level and estimate VaR.

The Monte Carlo simulation is a powerful technique for estimating VaR. Its main weakness, however, is the level of complexity involved and the amount of time required when simulating a large number of risk factors.

Example 4.9 Monte Carlo Simulation

Let us re-examine the previous example (Example 4.5) to calculate VaR in the case of a single risk factor using the Monte Carlo simulation approach. In order to simulate future returns, we use the GBM stochastic process. We used the input parameters – drift and standard deviation are 0.401% and 7.205% respectively –⁹⁰ to generate 20,000 simulated future monthly returns for the next period. The 95% VaR is slightly lower (11.29%) than the parametric VaR (11.79%). This is expected given the assumption of risk factor normality.



⁹⁰ Drift = $\mu - \sigma^2/2 = 0.00661 - 0.07205^2/2 = 0.00401$

Chapter 5

Credit Risk

5.1 What is Credit Risk?

Credit Risk is the most common risk that Islamic banks face, given that their operations dominated by debt-like transactions. Credit risk refers to the risk that one party to the contract (the debtor) will fail to fulfill his financial obligation in accordance with the agreed terms.⁹¹ Default may occur if the obligor is either *unable* or *unwilling* to pay the debt in full. Under certain circumstances, a well-intentioned obligor may not be able to fulfill the terms of the contract for reasons beyond his control. For example, a person who lost his job may find it difficult to meet his family expenses and simultaneously repay his debts. In contrast, under different circumstances, an obligor with sufficient means may choose not to honor his debt obligation. In practice, the two primary reasons for not satisfying the terms of a debt-like contract are commercial disputes over the validity or provisions of the contract, and the absence of penalty fees for late payments (or late delivery as in the case of *salam* contracts).

Credit risk is present in all types of debt-like transactions (i.e., *murabaha*, *salam*, *istisna* and *ijara*). An MPO transaction involves the sale of an asset on a deferred payment basis. A *salam* transaction on the other hand, involves the prepayment for goods to be delivered at a future specified date. Both delivery and payments can be deferred in an *istisna* transaction. Finally, *ijara* involves the right to use an asset for a specified period of time in exchange for periodic payments.

Transaction	Cause of Loss	Type of Loss
MPO	Nonpayment	Cost plus markup
	Late payment	Time value of money
	Dispute/enforcement	Frictional costs
Salam/Parallel Salam	Non-delivery	Replacement cost
	Late delivery	Frictional costs
Istisna/Parallel Istisna	Non-delivery	Replacement cost
	Late delivery	Frictional costs
	Dispute/enforcement	Frictional costs
Ijara	Nonpayment	

Figure 5.1 Debt-Like Transactions That Generate Credit Risk

⁹¹ Credit risk can also refer to a change in the credit quality of counterparties. We will tackle this type of credit risk when discussing Creditmetrics.

5.2 Why Measure and Manage Credit Risk?

Islamic banks need to understand the elements of credit risk and the techniques available to analyze and manage it. The management of credit risk is a key driver for the profitability of Islamic banks. Financial claims are characterized by limited upside return and large downside risk. By reducing credit losses banks can improve returns to shareholders.

Credit risk measurement is an essential part of the risk management process. By accurately measuring credit risk, the bank can (1) better assess whether to offer credit to the customer and under what conditions; (2) optimize portfolio risk adjusted returns; (3) properly set provisions for expected losses; and (4) ensure capital adequacy.

5.3 Measuring and Managing Credit Risk

The assessment of credit risk is similar to that of market risk in the sense that they both entail estimating the loss distribution over some horizon to calculate expected and unexpected losses. Although the concept is simple, the techniques used for measuring exposure are different for a number of reasons including: (1) lack of data; (2) highly skewed credit loss distribution with a fat lower tail; (3) non-tradability of credit risks;⁹² and (4) portfolio risks correlation.

The lack of data represents the biggest challenge to measuring credit risk. Data about the business is under the control of the customer and could be scattered throughout the firm. Moreover, a skewed loss distribution requires different estimation techniques. A portfolio of murabaha facilities generates a large number of small positive returns and a small number of large losses. And because the time horizon is much longer for credit risk (weeks and months), the mean of the loss distribution matters. For all of these reasons, minor differences in credit risk modeling can lead to significant differences in credit loss estimates.

5.3.1 Expected and Unexpected Losses

Expected credit loss refers to the amount that the Islamic bank could expect to lose, on average, over a period of time in the event of default. Expected loss (EL) should be calculated for every exposure in the book. Calculating the expected credit loss of a murabaha transaction requires estimating three parameters: the probability of default (PD), the expected exposure at the time of default (EAD) and the extent of loss given default (LGD).

$$EL = EAD \times PD \times LGD$$

Minimizing EL requires reducing the likelihood of default and/or losses suffered in the event of default.

⁹² Most Sharia scholars opine that murabaha debt cannot be traded. As a result, the sale of debt is very limited around the world with the exception of Malaysia: the Shariah Advisory Council of Bank Negara Malaysia considers it permissible.

Example 5.1 Expected Loss

An Islamic bank extends a USD 2 million unsecured commodity murabaha to *Ibn Sahl Vision*, a manufacturer of lens care products. The manufacturer agrees to pay the bank a markup of 5% and to settle payment in 360 days. If the bank estimates that the facility has a 3% probability of default in the next 12 months and a loss given default of 60%, the expected loss would be \$37,800.⁹³ A similar secured commodity murabaha would have an expected loss of \$10,800 if the pledged assets were valued at \$1.5 million.⁹⁴

5.3.1.1 Probability of Default

The probability of default is the likelihood that a counterparty will fail to meet its debt obligations over a given time horizon. Estimating the probability of default is often the first step in pricing and managing credit risk.

5.3.1.2 Exposure at Default

Exposure at default (EAD) is the total amount outstanding at the time of default. It does not account for on-balance sheet netting of debt and deposits unless the bank has the customer's permission to use netting. The use of netting without the permission of the client will subject the bank to a Shariah non-compliance risk, a topic that is discussed in detail in Section VI. on operational risks. EAD can be controlled through limit setting while LGD can be minimized through collateral management.

5.3.1.3 Loss Given Default

The loss given default (LGD) measures the loss that the bank suffers if the obligor defaults on his debt. It is defined as one minus the recovery rate on defaulted credit facilities. The estimation of LGD is not simple. It requires estimating the timing and amount of cash flows recovered (CFR), the legal and administrative costs incurred in collecting the debt (L&AC) and the proceeds from liquidating the collateral (COL). All values recovered net of costs should be discounted in order to account for the time value of money.

$$LGD = \frac{EAD - CFR + L\&AC - COL}{EAD}$$

Many factors influence LGD including macroeconomic environment and industry in which the debtor is operating. However, collateral management is the primary driver of recovery.⁹⁵

⁹³ EL = EAD x PD x LGD = USD 2.1 million x 0.03 x 0.6 = USD 37,800.

⁹⁴ EAD = USD 2.1 million (cost + markup) – USD 1.5 million (collateral) = USD 600,000

⁹⁵ Both the business cycle and the nature of the industry have an influence on the value of collateral.

A. Collateral

Collateral is an asset pledged by the obligor to secure the repayment of the debt in case of default. The bank can seize the asset if the debtor does not make the agreed-upon payments. Collateral comes in forms such as a third party guarantee, real estate, inventory, accounts receivable, fixed assets, stocks and sukuk. Banks require collateral for two reasons: (1) asymmetric information and (2) loss reduction in the event of default.

Asymmetric information: Asymmetric information arises whenever the bank lacks the information about the debtor's ability and willingness to fulfill his obligations. It can lead to two main problems of particular interest to banks: *ex ante* adverse selection and *ex post* moral hazard.

Adverse selection: Adverse selection occurs when potential obligors deliberately conceal certain pertinent information about the true nature of their projects from the bank. To mitigate the effects of adverse selection, banks require collateral as it conveys valuable information about the project and the client. The willingness of the client to provide collateral is an implicit declaration of the high chance of business success.

Moral Hazard: Moral hazard refers to the situation where the obligor has a tendency to take more risks after receiving financing. Collateral helps to minimize moral hazard by aligning the interests of the obligor with those of the bank. Providing collateral will induce the obligor to exert more effort to ensure that the business succeeds; otherwise, he will risk losing the collateral if the business fails. In general, the longer the maturity of a credit facility, the more serious the moral hazard problem is.

Example 5.2 Asymmetric Information and Collateral

An Islamic Bank is planning to introduce a new murabaha product for flower growers under the name of *Ibn Al Baytar* murabaha. However, the bank recognizes that it could encounter difficulties in accurately assessing the creditworthiness of potential clients because flower growers are under no obligation to publicly disclose their financial situation. Accordingly, murabaha transactions that would seem *ex ante* identical could very well be *ex post* different with respect to the likelihood of default and expected loss. An efficient way to mitigate the effects of asymmetric information is to require a collateral for this type of murabaha transaction.

Loss reduction: The contribution of collateral in reducing LGD depends on the nature and value of collateral. Collateral values can be quite volatile: they can fall in recessions when probabilities of default are high (e.g., real estate) and increase in more favorable macroeconomic environment.^{96,97} The most attractive collateral to banks is that which has the lowest volatility. Furthermore, the nature of the

⁹⁶ The debt to collateral ratio, which measures the outstanding debt balance relative to the market value of the collateral, strongly influences the likelihood of default. The obligor is more likely to default when the market value of the collateral drops below the outstanding balance of the debt.

⁹⁷ The value of certain types of collateral is not affected by the business cycle (e.g., cars).

collateral plays a role in recovery: highly specialized collateral has lower liquidation values resulting in higher LGD. Similarly, collateralized assets that depreciate rapidly have a negative impact on recovery rates.

Depending on the jurisdiction, it may take years for the bank to recoup its losses in case of bankruptcy. But because Islamic banks cannot consider any penalty fee beyond the outstanding balance as income, default will, other things being equal, result in higher LGD.

Haircuts: In many situations, the bank applies a haircut to account for potential deterioration in the market value of the asset pledged. For a certain type of collateral, a debt-to-value of x% implies a haircut of x% on the value of the collateralized asset. The size of the haircut depends on the liquidity of the collateral and its price volatility. More volatile and less liquid collateral requires higher haircuts to limit the bank's exposure to credit risk.

Example 5.3 Haircuts

A TRY 3,000,000 commodity murabaha is proposed for an established textile manufacturing business. Pledged assets are valued at a discount rate as follows:

Assets Pledged	Collateral Value	Haircut	
Real estate	2,000,000	20%	1,600,000
Inventory	1,200,000*	50%	600,000
A/R	800,000*	30%	560,000
Equipment	1,000,000	45%	550,000
TOTAL	TRY 5,000,000		TRY 3,310,000

*Book value

In this particular case, the purchase orderer has provided adequate collateral for the commodity murabaha (TRY 3,310,000).

In asset murabaha financing, the collateral is the asset itself. Thus, the bank must assess the market depreciation of the asset over the term of the financing.⁹⁸ The financing term depends on the market depreciation of the asset. Some assets retain their value for longer periods of time than others. For instance, the market depreciation rate of a car is much slower than that of a mainframe computer. In addition, the value of some assets follows business cycles (e.g., aircraft). This is because the demand increases during economic booms and falls during recessions.

Example 5.4 Market Depreciation of Assets

An Islamic bank is offering a murabaha auto financing under the following terms: Up to 80% financing and up to 60 months repayment period. A customer approaches the bank to finance the purchase of a USD 25,000 car. After reviewing the client's

⁹⁸ Market depreciation is the loss of value of an asset due to wear and tear, aging, and market conditions.

credit history, his monthly income, and assessing the true market value (TMV) of the vehicle, the bank decides to finance 80% of the car value at a markup of 11.18% (annual rate of return of 4.25%) over a period of 60 months.⁹⁹ The bank estimates the outstanding balance to value as follows:

Year	TMV	Value of Car	Debt A	DTV _A	Debt B	DTV _B
1	81%	\$20,250	\$16,332	0.807	\$17,788	0.878
2	69%	\$17,250	\$12,505	0.725	\$13,341	0.773
3	58%	\$14,500	\$8,512	0.587	\$8,894	0.613
4	49%	\$12,250	\$4,346	0.355	\$4,447	0.363
5	40%	\$10,000	0		0	

The outstanding balance is always below the true market value of the collateral over the entire financing term regardless of whether the bank calculates the amount of debt due on the basis of the unpaid principal (DTV_A) or by accounting for the outstanding markup as well (DTV_B).¹⁰⁰

Now assume that the car is financed over a period of 84 months at a markup rate of 16.76% (annual rate of return of 4.5%). In this case, the outstanding debt-to-value is much higher during the first few years of financing. Over the first three years, DTV_A and DTV_B are above the 80% and 90% thresholds respectively. The ratios remain high at the end of year 4 (63.7% and 66.7% respectively) in comparison to those of the 5 years auto financing (35.5% and 46.3% respectively). Hence, other things being equal, a five-year auto financing has a much lower credit risk than that of a seven years' financing.

MTV	Value of Car	Debt A	DTVA	Debt B	DTVB
81%	\$20,250	\$17,530	0.866	\$20,016	0.988
69%	\$17,250	\$14,912	0.865	\$16,680	0.967
58%	\$14,500	\$12,192	0.841	\$13,344	0.920
49%	\$12,250	\$9,346	0.763	\$10,008	0.817
40%	\$10,000	\$6,369	0.637	\$6,672	0.667

B. Relationship between PD and LGD

Many practitioners assume no link between PD and LGD. While this is true for some types of collateral (e.g., cars), it is not general true. For instance, during severe recessions, home values drop substantially

⁹⁹ TMV is the average price paid at the dealership.

¹⁰⁰ Recall that the bank has the discretion to forego any percentage of the markup that it deems appropriate.

causing a large increase in the ratio of outstanding debt to value of collateral. As a result, both PD and LGD rise causing a larger increase in expected loss.

5.3.1.4 Expected Credit Losses, Provisions and Credit Loss Reserves

Banks are required to hold adequate loss reserves to absorb all estimated inherent losses on murabaha transactions due to default. In this respect, one should differentiate between provisions required under IAS 39 for financial reporting, provisions required by supervisory authorities and provisions needed against expected credit losses of performing murabaha. Under current IFRS (IAS 39), the ‘incurred-loss’ approach is used to calculate credit loss reserves. An incurred-loss approach delays the recognition of inherent credit losses until a loss event has been identified and the amount of loss can be reasonably estimated. Used throughout most of the world for both financial reporting and prudential review, the incurred-loss approach has been the subject of fierce criticism since the global financial crisis of 2007-2009. By placing restrictions on the recognition of losses to ‘loss events’ that have occurred, the model contributes to capital procyclicality, magnifying the impact of economic downturns.

In response to concerns about the timing and adequacy of credit loss provisioning, in 2013, the IASB issued an exposure draft which proposes the replacement of the ‘incurred-loss’ approach with an impairment model based on ‘expected loss’. Under the new model, credit loss recognition would not be confined to losses that have already been incurred but will extend to expected credit losses (ECL) as well. As such, the effect of the proposed exposure draft on provisioning levels and capital would be significant.¹⁰¹ Loss provisions are likely to be in excess of what is currently being required under Basel standards. The ‘expected-loss’ model is applicable to debt instruments including loans, leases and receivables. Credit loss allowance is measured either as the 12-month expected credit losses or the lifetime expected credit losses if credit quality deteriorates significantly since initial recognition.¹⁰²

Example 5.5 Expected Loss Impairment Model

An Omani Islamic bank originates a 3-year murabaha facility for OMR 230,000 and requests payment on the following schedule: OMR 10,000 in year 1, OMR 10,000 in year 2, and OMR 210,000 in year 3. Given the credit quality of the purchase orderer and the economic outlook for the next 12 months, the bank estimates that the likelihood that the obligor will default in the next 12 months is 1 percent and that in the event of default, the bank will be able to recover 80% of the outstanding amount due (LGD = 20 percent). In this particular case, if the discount rate is 5%¹⁰³, the bank should recognize a credit loss allowance of OMR 400.¹⁰⁴

Now assume that credit risk has increased significantly since initial recognition. To accommodate for this type of situation, the bank should switch to lifetime expected credit losses in calculating loss allowance. If the murabaha lifetime probability of

¹⁰¹ The final proposal will not take effect before 2015.

¹⁰² Reporting entities can move back to a 12-month ECL if the transfer conditions to a lifetime ECL are no longer met.

¹⁰³ The bank uses the effective rate of return on the murabaha facility to discount the expected losses.

¹⁰⁴ 12-month expected credit losses = $(\text{OMR}210,000 \times 0.01 \times 0.2)/1.05 = \text{OMR}400$

default is estimated at 10 percent and default is expected in 2 years' time, loss allowance would be OMR3,810.¹⁰⁵

The 'expected-loss' approach is consistent with the forward-looking provisioning advocated by the Basel Committee under Basel III. As stated in the Basel III Accord, the committee is considering linking the 'expected loss' approach to regulatory capital. However, the rules governing such provisioning practices are waiting for the IFRS 9 standard to be issued.

Basel III – Forward looking provisioning (paragraphs 23-25)

"The Committee is promoting stronger practices through three related initiatives. First, it is advocating a change in the accounting standards towards an expected loss (EL) approach. The Committee strongly supports the initiative of the IASB to move to an EL approach. The goal is to improve the usefulness and relevance of financial reporting for stakeholders, including prudential regulators. It has issued publicly and made available to the IASB a set of high level guiding principles that should govern the reforms to the replacement of IAS39. The Committee supports an EL approach that captures actual losses more transparently and is also less procyclical than the current 'incurred loss' approach.

Second, it is updating its supervisory guidance to be consistent with the move to such an EL approach. Such guidance will assist supervisors in promoting strong provisioning practices under the desired EL approach.

Third, it is addressing incentives to stronger provisioning in the regulatory capital framework."

5.3.1.5 Pricing Murabaha Credit Risk

To optimize portfolio returns, Islamic banks need to accurately price the embedded credit risk exposures. A credit spread should be added to the cost of funding and to other administrative costs to cover for expected losses when pricing a murabaha facility.¹⁰⁶ The higher the credit risk exposure, the larger the expected loss and the wider the credit spread.

Expected loss depends on the creditworthiness of the obligor, the timing of default, economic environment and collateral. To reach a desired target level of EL, an Islamic bank needs to control LGD through collateral management. In other words, the bank should require more collateral from riskier purchase orderers. For instance, a bank would require more collateral from a BBB company than from an A rated company for it to maintain a target EL.

¹⁰⁵ Lifetime expected credit losses = $(\text{OMR}210,000 \times 0.01 \times 0.2) / (1.05)^2 = \text{OMR}3,810$

¹⁰⁶ Administrative costs include the costs associated with origination and monitoring.

Example 5.6 Pricing Credit Exposure

Consider two murabaha facilities with the following probabilities of default and loss given default:

	PD	LGD	EAD
Murabaha A	1%	30%	\$5M
Murabaha B	2%	30%	\$5M

Since EL_B (USD 30,000) is greater than EL_A (USD 15,000), the bank would charge a higher markup on murabaha B to compensate for the larger credit exposure. For the bank to charge the same markup on both transactions, it must require a higher collateral from the riskier purchase orderer (murabaha B) in order to reduce LGD_B to 15% such that $EL_A = EL_B = \text{USD } 15,000$.

The calculation of expected losses is straightforward once the risk manager obtains estimates of PD and LGD. However, due to modeling differences, financial institutions can end up with different values of EL for transactions of similar credit risk exposures.¹⁰⁷

5.3.1.6 Implications of regulatory capital and tax rates for murabaha pricing

The minimum markup that an Islamic bank would normally charge on a murabaha transaction is one that takes into account the funding structure, expected credit loss and the cost of capital. In other words, it is the rate that equates the capital invested with the present value of net cash flows. To assess the implications of regulatory capital and tax rates on murabaha pricing, let us consider the following example.

Example 5.7 Tax Implications

Consider a one-year USD 5 million murabaha facility funded with unrestricted profit sharing investment accounts (PSIA) of USD 4.6 million and equity of USD 0.4 million. The cost of equity is 15% and the bank pays a competitive rate of return of 7% on PSIA.¹⁰⁸ The corporate tax rate is 15%. For simplicity, we exclude operational expenses.¹⁰⁹ What is the minimum markup (M) required that would cover the cost of funds if we assume that EL is zero? Equating the capital invested to the present value of net cash flows and solving for M yields a value of 7.85 percent.¹¹⁰

$$0.4 = \frac{(M \times 5 - 0.07 \times 4.6) \times (1 - 0.15) + 5 - 4.6}{1.15}$$

¹⁰⁷ The various models used for estimating PD and LGD are discussed below.

¹⁰⁸ In principle, PSIA are risk-bearing investments tied to bank performance. In reality, however, most Islamic banks are forced to pay rates of return that are market competitive. As a result, they end up absorbing some of the commercial risks that are normally borne by IAH.

¹⁰⁹ Operational expenses include personnel and administrative expenses. Banks reduce operating expenses per transaction by either costs control or increase in volume.

¹¹⁰ In some cases, banks charge lower markups. This is particularly true when the bank can generate additional business from the customer.

In this particular example, the spread between the minimum markup and the rate of return on PSIA is 85 basis points. The spread will be much higher once we account for operational expenses and credit losses.

It should be noted that corporate tax rates vary across countries. Thus, the minimum markup required on identical murabaha transactions will be different across jurisdictions. The higher the corporate tax rate the higher the spread. For instance, if the tax rate is 20%, the spread will increase to 94 basis points.¹¹¹ On the other hand, the cost of equity, unlike the cost of debt, is not tax-deductible. Therefore, by substituting subordinated sukuk murabaha (Tier 2 capital) for equity, banks can reduce the minimum required markup rate on murabaha facilities. Suppose, for example, that the murabaha is funded by subordinated sukuk murabaha of USD 100,000 and by equity of USD 300,000. When the rate of return on the sukuk is 8%, the minimum required markup becomes:

$$M = \left[\left(\frac{0.15 \times 0.3}{1 - 0.15} \right) + 0.07 \times 4.6 + 0.08 \times 0.1 \right] / 5 = 7.66\%$$

Suppose now that the obligor has a 1% chance of defaulting and that the loss at default is 30%. In this case, the minimum markup required of 8.23% is obtained by solving the following equation:¹¹²

$$0.4 = \frac{0.99[M \times 5 \times 0.85 + 5] + 0.01[0.7 \times 5 + (0.15 \times 0.3 \times 5)] - 4.6 \times 0.07 \times 0.85 - 4.6}{1.15}$$

The wider spread (123 basis points) captures expected credit loss.¹¹³ The larger the credit risk the wider the spread. Finally, let us examine the implications of a higher capital on the minimum markup required. Assume that the murabaha is funded using equity of USD 500,000 instead of USD 400,000. Equating the capital invested to the present value of net cash flows and solving for M yields a value of 8.06%.

$$0.5 = \frac{((M \times 5 - 0.07 \times 4.5) \times (1 - 0.15) + 5 - 4.5)}{1.15}$$

Below is a summary of the minimum markup required for the different funding structures and corporate tax rates.

	Equity = 8%		Equity = 10%	
	EL=0	EL=USD 15,000	EL=0	EL=USD 15,000
Tax rate = 15%	7.85%	8.23%	8.06%	8.45%
Tax rate = 20%	7.94%	8.32%	8.18%	8.56%

111 Solving $0.4 = (((M \times 5 - 0.07 \times 4.6) \times (1 - 0.2)) + 5 - 4.6) / 1.15$ for M yields 7.94 percent.

112 The murabaha facility is funded by PSIA and equity only.

113 We used here the cost of capital to discount cash flows. An alternative approach would be to use a risk-adjusted discount rate. We address this topic when discussing RAROC and economic capital.

5.3.1.7 Unexpected Loss

Unexpected loss (UL) refers to losses over and above the average loss (EL). Because the timing and severity of unexpected losses are not known in advance, capital is required to absorb losses that exceed the mean. UL is calculated as the standard deviation from the mean:¹¹⁴

$$UL^2 = PD(1 \times EAD \times LGD - EL)^2 + (1 - PD)(0 \times EAD \times LGD - EL)^2$$

$$UL = \sqrt{PD - PD^2} \times EAD \times LGD$$

Example 5.8 Economic Capital

Suppose an Islamic bank provides a USD 5 million murabaha to *Jabir Ibn Hayyan Pharmaceuticals*, an A-rated company. If the probability of default of A-rated companies is 0.8% and the loss given default is estimated at 20%, then the unexpected loss is USD 28,273.¹¹⁵ This amount represents the economic capital required to absorb unanticipated credit losses.

Figure 5.2 displays the distribution of credit losses, which describes the likelihood of potential losses. Because most purchase orderers fulfill their obligations on time while only few default, the probability of significant losses is much lower than the probability of average losses or no losses. Accordingly, the distribution curve is skewed to the left. Expected loss is the average level of credit losses anticipated in the course of doing business. It is managed by risk based pricing and provisioning.

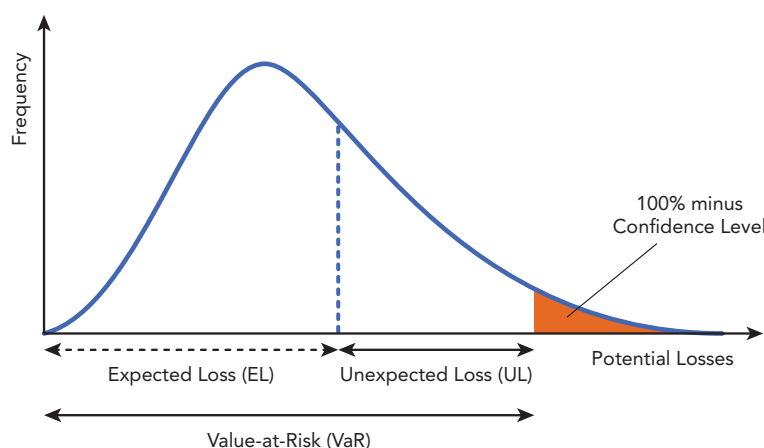


Figure 5.2 Expected and Unexpected Loss¹¹⁶

Unexpected loss, on the other hand, represents the deviation between a given confidence level and the expected loss. It is the difference between the p-percentile loss and EL. Suppose for example that the bank chose a confidence level of 99%. In this particular case, the likelihood that the bank will remain solvent provided it holds adequate reserves and capital against expected and unexpected credit losses

¹¹⁴ The derivation of UL is based on the assumption that both EAD and LGD are fixed and uncorrelated.

¹¹⁵ $UL = [0.0008 - (0.0008^2)]^{1/2} \times \text{USD } 5 \text{ million} \times 0.2 = \text{USD } 28,273$

¹¹⁶ Source: BCBS 2005, *An Explanatory Note on the Basel II IRB Risk Weight Functions*.

respectively is 99%. In other words, the likelihood of insolvency is only 1%. It should be noted that collateral can reduce expected losses of murabaha while portfolio diversification across industries and geographical areas can reduce unexpected losses.

5.3.1.8 Economic Capital

Economic capital is the amount of capital a bank needs in order to protect itself against all risks it undertakes. It should not be confused with regulatory capital which is the minimum capital required by the regulator. Two otherwise identical murabaha transactions can have different economic capital requirements but identical regulatory capital requirements. Furthermore, a single murabaha transaction can have different capital requirement implications for different banks. Accordingly, both economic capital and regulatory capital should influence decision-making. Consider the example of two banks with different economic and regulatory capital requirements.

(Million USD)	Regulatory Capital	Economic Capital
Bank ABC	25	30
Bank XYZ	30	25

Bank ABC has an economic capital surplus while bank XYZ has a regulatory capital surplus. As a result, the two banks could have different incremental capital requirements for new investments. To see this, suppose that murabaha1 requires a regulatory capital of \$5 million while murabaha2 requires an economic capital of \$5 million.

(Million USD)	Regulatory Capital	Economic Capital
Murabaha1	5	0
Murabaha2	0	5

Since bank ABC has an economic capital surplus of \$5 million, it can add murabaha1 to its portfolio without raising capital. Bank XYZ, on the other hand, is required to increase its regulatory capital by \$5 million if it wants to invest in murabaha1. Adding murabaha2 to the portfolio of either Bank ABC or Bank XYZ will have opposite effects. In other words, Bank XYZ can invest in murabaha2 without increasing its capital whereas bank ABC needs to raise its economic capital if it decides to add murabaha2 to its portfolio.¹¹⁷

Given its risk appetite, an Islamic bank must ensure that it holds adequate economic capital to maintain its target credit risk. Otherwise, it risks being unless it increases its capital or reduces its risks.

¹¹⁷ Because of the distinction between regulatory and economic capital, overcapitalized banks can exploit the rate of return risk by simply investing in long term treasury sukuk that are financed by overnight commodity murabaha.

5.4 Classification of Credit Risk Models

The most widely used methods for measuring credit risk exposure can be classified into three categories: traditional methods; credit pricing models; and creditMetrics. Over the last decade, an increasing number of banks have used quantitative measurements to select and price credit transactions.

5.4.1 Traditional Methods

In this section, we introduce three traditional methodologies for measuring credit risk: (1) the 5Cs of credit; (2) rating systems; and (3) credit scoring models. The 5Cs method examines five characteristics of the purchase orderer to determine the chance of default. Rating systems, on the other hand, are based on a mix of qualitative and quantitative assessment. A major shortcoming of all three approaches is their focus on the creditworthiness of the obligor: the potential loss in case of default is either ignored or considered secondary.

5.4.1.1 The 5Cs of Credit

Bankers often use five key factors to determine the creditworthiness of an obligor: character, capital, capacity, collateral and conditions.

Character refers to the trustworthiness of the purchase orderer with regard to the prompt and timely repayment the debt. Bankers rely mainly on credit history to assess the character of the purchase orderer.

Capacity refers to the ability of the purchase orderer to repay the debt. Bankers usually analyze historical cash flows to determine the customer's financial capacity to repay the debt.

Capital refers to the equity contribution of the purchase orderer in relation to debt. Equity investment is an indication of the level of financial risk the customer is willing to commit.

Collateral or third party guarantees refer to forms of security that the obligor provides to the bank. Most collateral is in the form of real estate, equipment, account receivables and inventory. The bank takes possession of the collateral if the obligor fails to pay the debt. A guarantee, on the other hand, is a pledge by a third party to pay the debt in case of default. Both collateral and guarantees represent a secondary source of repayment.

Conditions refer to the overall environment the business is operating in. Bankers assess the sensitivity of the business to surrounding conditions including competitiveness, consumer trends, industry issues, and the economy.

Before approving an MPO transaction, the banker needs to ensure that the purchase orderer (i) is trustworthy; (ii) can generate enough cash flow to pay the debt; (iii) has committed adequate investment capital; and (iv) has provided sufficient collateral and guarantee as a secondary source of repayment. In addition, the banker must be confident about the obligor's ability to pay the debt under unfavorable conditions.

While most banks use the 5Cs of credit in the valuation process, they do not place the same emphasis each of the five factors. Different banks have different criteria for weighing factors, because the entire process is based on the expertise and judgment of the credit officer. Thus, although this method uses both qualitative and quantitative information, it is subjective in nature. When provided with the same set of information, two experts can reach different conclusions.

The assignment of risk scores is based on personal information (retail credit) and financial statements (corporate credit). The scoring process is supplemented with information from external rating agencies and credit bureaus whenever available. Based on the score the customer gets, the bank decides (1) whether to approve or reject a new murabaha transaction, and (2) if the transaction is approved, the amount of financing, the markup cost and other terms and conditions (e.g., collateral).

5.4.1.2 External Ratings

Rating agencies provide informed opinions about the creditworthiness of issuers (issuer credit ratings) and obligations (issue-specific credit ratings) based on a mix of qualitative and quantitative factors including the financial strength of the issuer, the quality of management, competitive environment, and vulnerability to regulatory changes. The three global rating agencies are Fitch Ratings, Moody's Investors Service and Standard and Poor's (S&P). Although the agencies have equivalent rating grades, they do not use the same measurement criteria for grading. S&P's ratings reflect an opinion about the probability of default whereas Moody's ratings are based on expected credit loss. All three agencies provide ratings for Islamic sukuk using their existing fundamental methodologies.¹¹⁸

Malaysia, Indonesia and Turkey are examples of countries where there are domestically focused rating agencies. In Malaysia, for example, corporations that want to issue bonds or sukuks are required to obtain a rating from one of the two domestic rating agencies, Rating Agency Malaysia Bhd (RAM) or Malaysian Rating Corporation (MARC). Both RAM and MARC are designated by Bank Negara Malaysia as an External Credit Assessment Institutions (ECAI). Banks can also use their ratings to calculate capital adequacy under Basel II. Both rating agencies use similar approaches to assess the likelihood of default of conventional bonds and debt-based Islamic financing instruments.

With the exception of the Islamic International Rating Agency (IIRA), there are no domestic credit rating agencies in the MENA region. Based in Bahrain, IIRA was established in 2005 with the objective of rating Islamic financial institutions and Islamic financial products. Designated by the Central Bank of Bahrain as an ECAI, IIRA is also on the list of approved rating agencies of Islamic Development Bank.

Ratings are broken down into two categories: Investment-grade (BBB/Baa or above) and speculative or noninvestment-grade (BB/Ba or below). Facilities and obligors that belong to the later category are more likely to default. Ratings affect the ability of borrowers to access markets as well as the cost of their financing. The lower the rating the greater the risk of default and the higher the risk premium that investors require.

¹¹⁸ Moody's considers that the risk and return profile of sukuk is equivalent to conventional bonds, hence their conventional rating methodologies would generally apply to sukuk.

External credit ratings are “through-the-cycle” ratings designed to measure expected creditworthiness over the debt maturity time horizon. By factoring the effect of business cycles, a rating becomes less volatile and less sensitive to changes in economic conditions. “Point-in-time” ratings, on the other hand, are intended to assess credit risk at a given horizon. As such, they are more sensitive to changes in economic conditions and therefore more appropriate for the allocation of economic capital.

Figure 5.3 summarizes S&P’s corporate default rates.¹¹⁹ For instance, there were no defaults for the AAA category while the global default rate stood at 0.24% for BBB rated entities and 4.48% for B rated issuers.

Rating	Default Rates*
AAA	0.00
AA	0.02
A	0.08
BBB	0.24
BB	0.89
B	4.48
CCC/C	26.82

*Weighted LT average (%)

Figure 5.3 One-Year Global Default Rates

A. Credit Risk Migration

Credit agencies revise their credit ratings periodically. They provide transition matrices that capture the likelihood of an entity migrating from one credit rating category to another over a given period of time. MARC 1-year transition period is shown in Exhibit 5.4.

(%)	AAA	AA	A	BBB	BB	B	C	NR	Default
AAA	94.9	0.7	0.0	0.0	0.0	0.0	0.0	4.4	0.0
AA	2.4	83.4	5.4	0.0	0.0	0.0	0.0	8.3	0.5
A	0.0	2.8	78.0	3.5	0.4	0.0	0.0	13.0	2.4
BBB	0.0	0.0	7.7	59.6	5.8	1.9	0.0	17.3	7.7
BB	0.0	0.0	0.0	0.0	65.0	20.0	0.0	15.0	0.0
B	0.0	0.0	0.0	0.0	0.0	68.8	0.0	12.5	18.8
C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: MARC 2012 Annual Corporate Default and Rating Transitions Study

Figure 5.4 One-Year Cumulative Transition Matrix (1998-2012)

The table shows that 94.9% of entities rated AAA maintained their rating over the survey period, but only 59.6% of BBB rated entities maintained their rating. On the other hand, 7.7% of BBB entities defaulted while another 7.7% migrated to an A category and another 5.8% were downgraded to a BB rating.

5.4.1.3 Internal Ratings

External ratings play an important role in quantifying credit risks of large corporations issuing public debt. Internal ratings, on the other hand, are useful in measuring credit risk of small and medium enterprises (SMEs) that are not listed on stock exchanges. A typical internal rating system initially assigns a credit risk rating to each obligor based on creditworthiness (PD). In addition, ratings are assigned to individual credit facilities granted to an obligor based on riskiness (EL).

When establishing an internal rating system, an Islamic bank needs to address the following issues: (1) structure of the rating system; (2) rating process; and (3) validation.

A. Structure of Rating System

Internal rating system structures differ across banks. The primary determinants of an internal rating system structure are the following: (i) the approach used in rating facilities, (ii) the rating scale, and (iii) time horizon. A two-dimensional rating system consists of first rating the purchase orderer (on the basis of PD) before assigning a murabaha facility grade (on the basis of LGD) to ensure greater accuracy and consistency in grading. A one-dimensional system, on the other hand, only assigns an overall rating to facilities (EL).¹²⁰ A major consideration in assigning grades to credit facilities is the existence and type of collateral or guarantee, the maturity of the transaction and the creditworthiness of the obligor. As a result, different grades can be assigned to different credit facilities that belong to the same obligor. The higher the quality of the collateral then, other things being equal, the higher the grade assigned and the lower the risk premium required. Similarly, the shorter the maturity, the better the rating and the lower the markup required. It should be noted, however, that it is much easier to assign a grade when collateral is linked to a single credit facility rather than multiple transactions.

The optimal number of grades of a rating scale depends on the range of default probabilities and the degree of concentration of credit exposures. The higher the concentration the greater the need to increase the number of grades to better assess risk and subsequently to allocate capital efficiently and better be able to price risk.¹²¹ On the other hand, the smaller the number of purchase orderers in each grade the greater the need to reduce the number of grades to increase the accuracy of risk estimation. Internal rating systems differ across banks in terms of rating scale, even when two banks have identical rating scales, the risks associated with the same grades are different. This is almost always true since the assignment of a rating involves the exercise of human judgment by experienced credit analysts.

¹²⁰ Most banks only assign ratings to facilities.
See Treacy W. and Carey M., *Credit Risk Rating at Large U.S. Banks*, Federal Reserve Bulletin, November 1998, pp.897-921.

¹²¹ The majority of the largest US banks use rating scales that have 4 to 6 Pass grades (Treacy and Carey 2000)

Two different approaches can be used to assess the creditworthiness (PD) of an obligor under adverse economic conditions. The rating decision can be based either on the current conditions of the purchase orderer (point-in-time rating system) or on the expected creditworthiness over the life of a murabaha (through-the-cycle system). The probability of default is more responsive to business cycles under a point-in-time system.

B. Rating Process

A rating process generally includes three steps to ensure that ratings are accurate and consistent:

- (1) the use of a quantitative rating model;
- (2) rating adjustments based on professional judgment of qualitative factors; and
- (3) the use of external information for calibration.

The first step in the rating process involves the use of a quantitative rating model. For example, with the help of a statistical credit-scoring model, the analyst can estimate scores to construct credit risk categories. Each obligor is assigned a preliminary grade or numeral based on the quantitative analysis. Rating numerals denote credit quality: the higher the number assigned, the lower the credit quality and the greater the likelihood of default. For instance, on a scale of 1 to 6, a rating of 6 implies that the debt is in default.

The next step is for the expert to supplement the quantitative analysis with a qualitative assessment before assigning a final grade. In the absence reliable quantitative information, banks rely mostly on the judgment of experts. Rating reviews are necessary when new information becomes available to reflect changes in credit risk.

External information is used to ensure the accuracy of ratings. Examining rated facilities with similar characteristics allows the bank to identify mistakes in rating assignments. Furthermore, the accuracy of ratings is established by taking the average cumulative default rates for each rating category. The lower the rating the higher the cumulative default rates.

In assessing the creditworthiness of purchase orderers and the riskiness of murabaha facilities, banks analyze both quantitative and qualitative attributes of the customer. These include future earnings and cash flows, financial leverage, quality of assets, reliability of financial statements, firm competitiveness within the industry, regulatory changes, technological changes, and so forth. Professional raters rely heavily on judgment in selecting and weighting factors.

5.4.1.4 Credit Scoring Models

Credit scoring is the principle tool used by banks to measure retail credit risk. Examples of retail credit include auto financing, ijarah, SME financing and credit cards. Given the large number of small exposures, automating the credit approval process can save time, reduce costs and ensure consistency.¹²² Reducing the average time required to process credit decisions from days to only few

122 The average bank has thousands of customers and carry out hundreds of thousands of transactions each year.

hours – or even minutes - can increase profit margins.¹²³ Furthermore, using a similar set of rules over time ensures the consistency of the credit decision process.¹²⁴

Credit analysts use different credit scoring models to assess the creditworthiness of the applicant. The most widely used statistical models are

- (1) the discriminant analysis,
- (2) the logistic regression, and
- (3) the neural networks. We will discuss the first two techniques below.

A. Discriminant Analysis

The discriminant analysis is a statistical technique used by credit analysts to discriminate *ex ante* between defaulters and non-defaulters on the basis of a score assigned to each customer. The score is the weighted sum of key discriminating variables of creditworthiness. The higher the score, the lower the risk of default.

$$\text{Discriminant score} = w_1X_1 + w_2X_2 + \dots + w_nX_n$$

The values for the weights are chosen to maximize the variance between the two groups; i.e., defaulters and non-defaulters.

Altman's Z Score Model

Altman's Z Score is the most famous statistical technique of discriminant analysis. It has been applied to publicly owned manufacturing companies, private companies, and emerging market companies. For example, for privately held manufacturing companies, the Z score was found to be as follows:¹²⁵

$$Z = 0.717X_1 + 0.847X_2 + 3.107X_3 + 0.420X_4 + 0.998X_5$$

where:

X_1 = (Current assets-Current liabilities)/Total assets

X_2 = Retained earnings/Total assets

X_3 = Earnings before income and taxes/Total assets

X_4 = Book value of equity/Total liabilities

X_5 = Sales/Total assets

¹²³ Given the amount of information, it takes about few days for a credit officer to manually review a credit application.

¹²⁴ It is impossible for a credit analyst to consistently weight and treat applicants' characteristics given the large amount of information. For instance, a credit analyst who examines only ten characteristics of three attributes each will end up with 59,049 possible combinations! Furthermore, it is difficult to rely on judgment to assess riskiness when some of the firm's key financial ratios are above average whereas others are below average.

¹²⁵ See Altman E., *Predicting Financial Distress of Companies: Revisiting the Z-Score and ZETA Models*, Handbook of Research in Empirical Finance, 2012.

The Z score, in this particular case, is the weighted sum of five key financial ratios that measures liquidity, reliance on leverage, profitability, solvency and activity.¹²⁶ A company is most likely to default if the Z score is less than 1.23 and unlikely to default if the score is greater than 2.9. On the other hand, default cannot be predicted accurately in the 'gray area' where scores fall between 1.23 and 2.9.

Example 5.9 Z-Score Model

Ibn Sahl Vision, a privately held manufacturer of lens care products approaches an Islamic bank for a USD 2 million unsecured commodity murabaha. Using the company's financial statements, the credit analyst summarizes the five key ratios as follows: $X_1=0.303$, $X_2=0.357$, $X_3=0.115$, $X_4=0.778$, $X_5=2.524$. The Z score is then calculated using Altman's Z Score estimated function for privately held manufacturing companies.¹²⁷

Z Score =

$$0.717 \times 0.303 + 0.847 \times 0.357 + 3.107 \times 0.115 + 0.420 \times 0.778 + 0.998 \times 2.524 = 3.72$$

Since the Z score is greater than 2.9, this indicates that *Ibn Sahl Vision* is unlikely to default on the unsecured commodity murabaha.

B. Logistic Regression

The Logistic regression is a very popular probabilistic statistical classification model for mapping credit scores to default probabilities. The model uses the following logistic function:

$$P_i = \frac{1}{1 + e^{(-\alpha - \beta'x_i)}}$$

where P_i is the customer's probability of default, x is the vector of key financial ratios and α , β are estimated parameters.¹²⁸ The logistic function transforms credit scores ($S = \alpha + \beta'x$) – which describe the credit quality of customers – into probabilities of default.¹²⁹ It has an S shape starting at zero and converging to 100% (Figure 5.5). The higher the score, the lower the credit quality and the closer the probability of default is to 100%. The appeal of this model is the ease of computation of default probabilities once the parameters have been estimated.¹³⁰

¹²⁶ The Z Score accuracy relies on the quality of the underlying financial statements data.

¹²⁷ Altman's Z score estimated function is being used in this example for the sake of illustration. In practice, Islamic banks should estimate their own Z score functions based on historical data and information about potential clients.

¹²⁸ Vector x consists of key characteristics such as income, occupation, credit history, etc. when evaluating the creditworthiness of individuals.

¹²⁹ S is a linear combination of the estimated coefficients and key financial ratios.

¹³⁰ In general, in order to produce a best fit between predicted defaults and actual defaults, the maximum likelihood estimation (MLE) is used for the estimation of the parameters. A word of caution is in order. The aforementioned logit model assumes by definition a linear relationship between the credit score and the key indicators. If the functional form is incorrect, applying a non-linear transformation will produce a better fit and subsequently a more powerful predictive model.

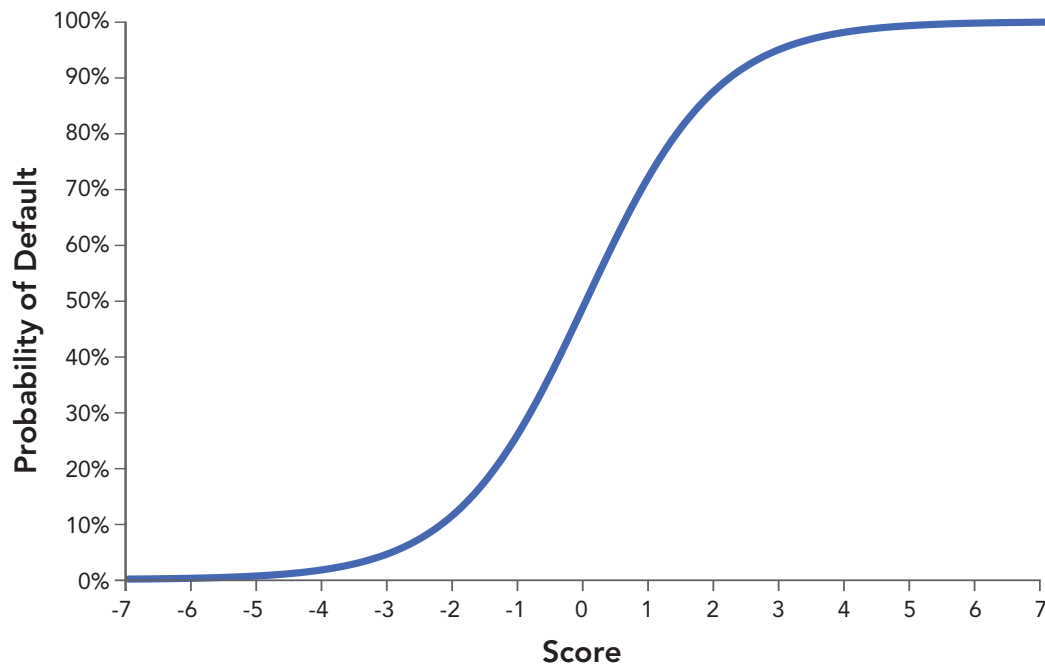


Figure 5.5 The Logistic Distribution Function

Example 5.10 Logistic Statistical Model

A credit analyst wants to assess the likelihood of default of three different companies seeking murabaha facilities. Suppose he identifies profitability, liquidity and solvency ratios as the three key financial indicators of creditworthiness and assume that the estimated logistic function looks as follows:

$$P_i = \frac{1}{1 + e^{(-1.05 + 3.03X_1 + 5.74X_2 + 2.23X_3)}}$$

where $X_1 = EBIT/TA$, $X_2 = (CA-CL)/TA$, and $X_3 = BE/TL$. Using the companies' financial statements, the credit analyst summarizes the three key ratios as follows:

	X1	X2	X3
Company A	0.138	0.147	0.149
Company B	0.168	0.444	0.546
Company C	0.115	0.291	0.593

In this particular case, the likelihood of default of companies A, B and C are respectively 36.7%, 3.8% and 9.2%.

5.4.1.5 Validation of Rating Systems

Validation is the process of testing a rating system's ability to discriminate between defaulters and non-defaulters. The cumulative accuracy profiles (CAP) – and to a lesser extent the receiver operating characteristic (ROC) – is commonly used to evaluate the quality of their rating systems. A rating system that fails to accurately and consistently rank debtors according to their true creditworthiness (PD) could lead to sub-optimal capital allocation.

Rating models are subject to two types of errors: Type I errors occur when the model assigns a low grade or score to a high credit quality murabaha facility. The bank will lose potential profits when similar transactions are rejected or lost to competitors. In contrast, a Type II error is the result of assigning a high ranking to a low credit quality murabaha. In this case, the bank is more likely to lose both the cost and markup than was predicted by the model.

		Actual Credit Risk	
		Low Credit Risk	High Credit Risk
Model Credit Risk	Low Credit Risk	Accurate	Type II Error
	High Credit Risk	Type I Error	Accurate

Banks usually seek to minimize both Type I and Type II errors. However, they pay more attention to Type II errors given the serious consequences they can have on profitability.¹³¹

A. Cumulative Accuracy Profile

The cumulative accuracy profile (CAP) provides a visual way of diagnosing the ability of a model to predict default. A powerful model is one that discriminates well between defaulters and non-defaulters.¹³²

The CAP is constructed as follows:

Step 1: Assign a score to each debtor such that the higher the score the higher the likelihood of default.¹³³

Step 2: Rank debtors on the basis of the scores assigned from the least likely to default to the most likely to default.

Step 3: Construct CAP by calculating the fraction of actual defaulters of the different percentiles of the score distribution.

The CAP can take any of three shapes based on the predictive power of the model (Figure 5.6):

¹³¹ Financial claims are characterized by limited upside return and large downside risk.

¹³² Reliable historical data on ratings and default behavior is a key factor in the successful construction of powerful credit scoring models and for validation purposes. In the absence of reliable data, analysts rely on non-optimal heuristic methods (experience based techniques).

¹³³ Obligors can be ranked by grades as illustrated next.

Perfect Model: A perfect rating model is very powerful at discriminating between defaulters and non-defaulters. All defaulters are assigned low scores and none of the high scoring debtors default. As such, CAP increases linearly and then flattens at 100%.

Random Model: The random model has no predictive power of discriminating among defaulters and non-defaulters. Debtors are assigned scores randomly such that the fraction of defaulters that are assigned a score s or below equals the fraction of total debtors that have a score s or below. CAP in this case increases linearly up to 100%.

Rating Model: The CAP curve has a concave shape and lies somewhere between the two extremes. The closer CAP is to the perfect model the better the model is at predicting default. In contrast, the further away it is (the closer to the random model) the weaker the model's discriminatory power. A model's ability to predict defaults can be measured by the Accuracy Ratio (AR).

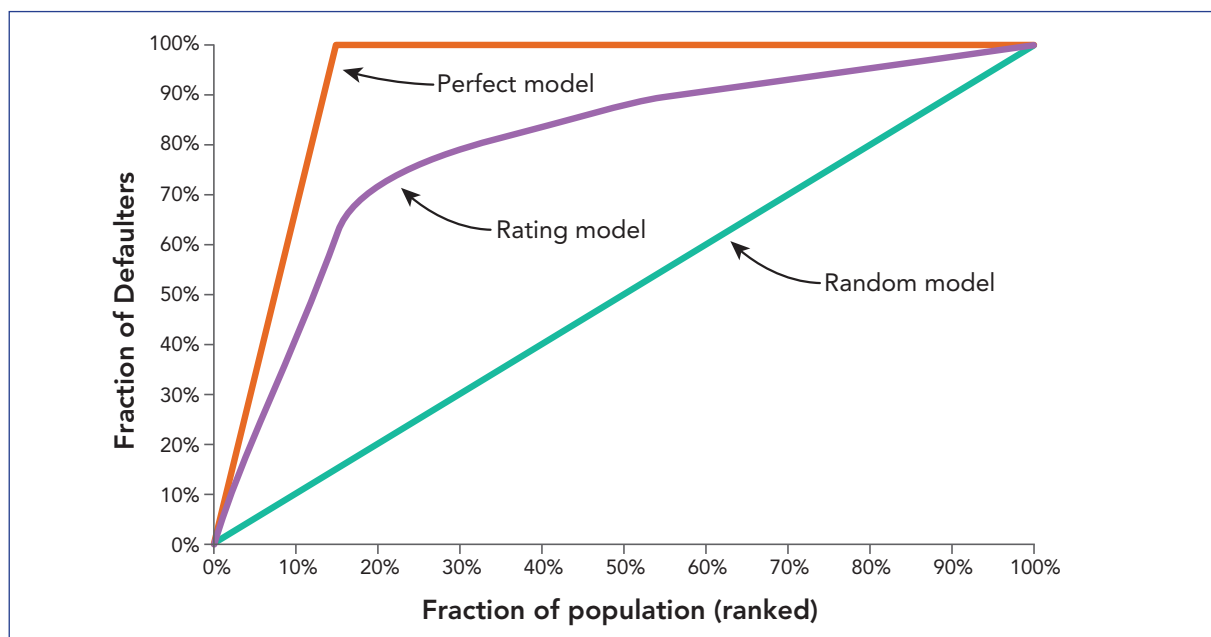


Figure 5.6 Cumulative Accuracy Profile

B. Accuracy Ratio

The accuracy ratio (AC) is a metric that summarizes the predictive power of rating models. It is defined as the area between the CAP curves of the real model and the random model over the area between the CAP curves of the perfect model and the random model. The closer the real model is to the perfect model, the higher the accuracy ratio and the more powerful the model is at discriminating among debtors. In contrast, the closer the real model is to the random model, the lower the accuracy ratio and the weaker the model is at predicting defaulters. The accuracy ratio ranges between 0 and 1.

Example 5.11 Cumulative Accuracy Profile

Consider an Islamic bank that classifies debtors on a ten-point scale from 1 to 10. The table below summarizes the frequencies of defaulters and non-defaulters for each rating group and their corresponding cumulative probabilities. For instance, out of 600 customers classified as rating group 4, seven have defaulted. Debtors ranked grade 4 or lower represent 31.7% of the total population whereas defaulters ranked grade 4 or lower account for 79.3% of total defaulters.

	Rating									
	1	2	3	4	5	6	7	8	9	10
Frequency										
Default	1	3	5	7	10	12	12	18	60	56
No Default	149	97	335	593	550	388	318	172	190	174
Total	150	100	340	600	560	400	330	190	250	230
Cumulative Probabilities										
Default	0.304	0.630	0.728	0.793	0.859	0.913	0.951	0.978	0.995	1.00
Population	0.073	0.152	0.213	0.317	0.444	0.622	0.813	0.921	0.952	1.00

The CAP is constructed by plotting the cumulative probabilities of default against the cumulative probabilities of the population sorted by grades. In this particular example, the CAP curve increases sharply which indicates that most defaulters are assigned low scores. Thus, the model used by the Islamic bank has a good predictive power (Figure 5.7).

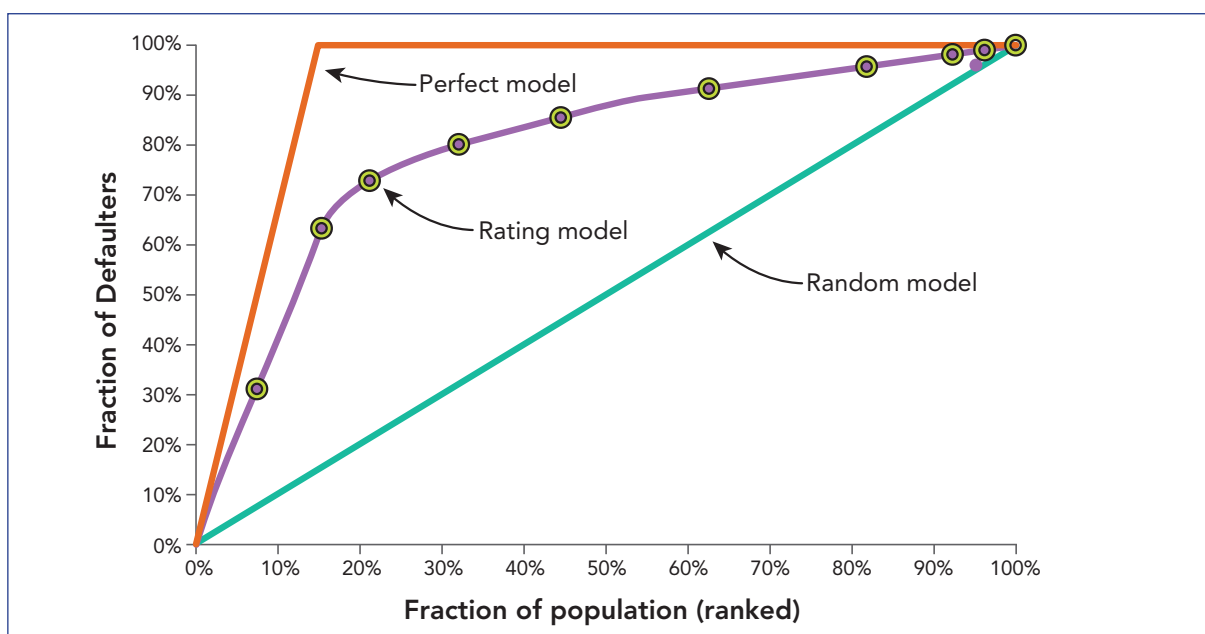


Figure 5.7 Cumulative Accuracy Profile

5.4.2 Structural Models

Structural models are equity-based models that treat default as an endogenous process where the probability of default is a function of the firm's value. They are best applied to publicly traded companies. Based on Merton's option-pricing model, KMV is the most popular structural approach to evaluate the creditworthiness of a corporation. In a Merton's model, limited liability companies are financed by a simple capital structure of debt and equity:

$$\text{Value of assets} = \text{Value of debt} + \text{Value of equity}$$

Default is expected to occur if the value of assets is insufficient to repay the debt. Otherwise, shareholders repay the debt and keep the residual value of the firm.¹³⁴

5.4.2.1 KMV Approach

The KMV model assesses the credit risk of a corporation by calculating the expected default frequency (EDF), a forward-looking measure of PD. The derivation of EDF is carried in four steps:

Step 1: Estimate the current market value (V_0) and volatility of the firm's assets (σ) using Merton's *option pricing* framework.¹³⁵

Step 2: Determine the default point (DPT). The firm is expected to default if the value of its assets falls below a threshold associated with the firm's debt. The default point is calculated as follows:

$$\text{DPT} = \text{Total ST liabilities} + \frac{1}{2} \text{Total LT Liabilities}$$

Step 3: Estimate the expected rate of return on the firm's assets (μ)

Step 4: Calculate the distance to default (DD) as follows:

$$DD = \frac{\log(V_0/\text{DPT}) + (\mu - \sigma^2/2)T}{\sigma\sqrt{T}}$$

DD measures the distance the expected value of the firm's assets is from the default point. The further the distance is, the lower the likelihood of default.

Step 5: Estimate the expected default frequency (EDF) as the proportion of public firms of a given DD that have actually defaulted.

¹³⁴ Readers familiar with options will recognize the similarities with the payoff of a call on the value of the firm. If debt exceeds assets, shareholders will exercise their right of walking away and leaving the firm to creditors.

¹³⁵ Only the price of publicly traded companies can be directly observed which requires the estimation of the market value and volatility of assets.

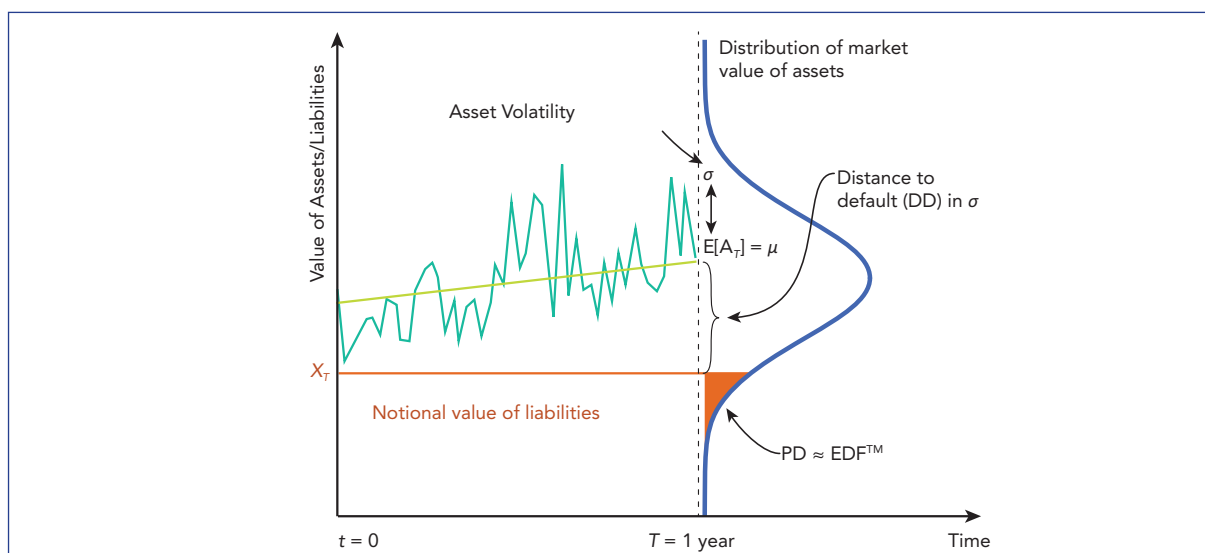


Figure 5.8 Distance to Default

Source: EDF Overview, Moody's Analytics

Example 5.12 Expected Default Frequency

Jabir Ibn Hayyan Pharmaceuticals, a publicly traded company, approaches an Islamic bank for a murabaha facility. The company's current market value is estimated at USD 120 million and its annualized asset volatility (σ) at 15%. Using the firm's financial statements, the default point is calculated at USD 50 million. What is the probability that the firm will default by the end of year one? If the firm's assets grow at a rate of 15% then the distance to default is 7. Assume that out of 5,000 firms with a DD of 7, only 7 defaulted over a 1-year horizon. In this particular case, the expected default frequency is 0.0014.

One of the biggest advantages of the KMV structural model is its ability to quickly capture deteriorations in credit quality. However, because the model relies on equity prices to estimate default frequencies, it works best in highly efficient liquid markets. On the other hand, its biggest disadvantage is its sensitivity to market bubbles. A bubble in the equity markets is translated into increases in EDFs even when credit qualities are unaffected.

5.4.3 CreditMetrics

So far, we have assessed the loss that an Islamic bank would incur in the event of default. But banks can also lose money if credit facilities are downgraded.¹³⁶ A lower credit quality implies a higher chance of default. Based on credit migration analysis, CreditMetrics allows the estimation of the distribution of the value change of a credit facility (or portfolio) that results from changes in credit quality. The four steps for calculating credit risk are as follows:

¹³⁶ The sale of debt is widely practiced in Malaysia.

1. Use transition matrices to estimate the likelihood of credit quality migration
2. Revalue the credit facility under different migration scenarios
3. Estimate the value change distribution
4. Calculate the credit risk

The following example will show how to calculate the credit risk of a single murabaha facility using the Creditmetrics approach.

Example 5.13 Expected Default Frequency

Suppose you want to assess the credit risk of a three-year A rated murabaha facility of USD 10 million payable as follows: USD 500,000 at the end of years 1 and 2 and USD 10.5 million at the end of year 3 (markup of 15%). The first thing to do is to determine the probability that the murabaha will maintain its current rating, migrate to any of the other rating classes, or default. Assume the probabilities of credit migration for an A rated facility are as follows:

	AAA	AA	A	BBB	BB	B	CCC/C	D
A	0.03	1.96	91.65	5.75	0.37	0.15	0.02	0.07

The likelihood that the murabaha facility will upgrade to a AA rating is 1.96% while the chance of ending up with a BBB rating is 5.75%. On the other hand, there is a small chance of default (0.07%).

The next step is to estimate the change in value of the murabaha facility due to changes in credit quality. To calculate the new value the murabaha facility under different migration scenarios, we revalue the present value of the remaining future cash flows at a discount rate that reflects the new risk class. Therefore, the discount rate will be higher in case of downgrading and lower in the event of upgrading. Suppose the rate of return on BBB-rated murabaha facilities is 5.4%. The value of the murabaha facility at the end of year one provided it is downgraded to BBB is USD 9.93 million.

$$V_{BBB} = 5 + \frac{5}{1 + 0.054} + \frac{10.5}{(1 + 0.054)^2} = 9.93$$

By repeating the process for all migration states, we obtain the following values (in USD millions) after discounting using the corresponding rates for year 1 and year 2:

	AAA	AA	A	BBB	BB	B	CCC/C	D
r1(%)	3.98	4.04	4.12	4.54	6.14	6.70	12.65	
r2(%)	4.25	4.30	4.40	4.76	6.13	7.15	11.80	
V(\$millions)	10.14	10.13	10.11	10.04	9.79	9.61	8.84	3

The recovery rate is estimated at 30% of murabaha cost.

Assume that we want to calculate the 0.1 percentile level of risk. The likelihood of defaulting is only 0.07%, which is less than 0.1%. The combined probabilities of default and of migrating to CCC/C are 0.09, still less than 0.1%. By adding the probability of migrating to B, the combined probabilities exceed 0.1%. Thus 99.9% of the time, the value of the murabaha facility will not drop below USD 9.61 million.

	AAA	AA	A	BBB	BB	B	CCC/C	D
Prob.	0.03	1.96	91.65	5.75	0.37	0.15	0.02	0.07
V	10.14	10.13	10.11	10.04	9.79	9.61	8.84	3

Operational Risk

In the last two decades, many financial institutions around the world have experienced significant losses due to operational risk incidents. Examples include the USD 1.3 billion unauthorized trading loss at Barings Bank (1995), the USD 7.2 billion rogue trading loss at Société Générale (2008), the USD 13 billion civil settlement at JP Morgan Chase (2013), the USD 242 million SEC fine for concealing a significant computer coding error at AXA Rosenberg Group (2011), the USD 4.3 billion internal fraud loss (illegal bad loans) at Busan Savings Bank (2011) and the USD 173 million external fraud loss at China Construction Bank (2011). But operational risk incidents were not confined to conventional banks; they also hit Islamic banks. For instance, in 1998 Dubai Islamic bank (DIB) lost about USD 300 million due to internal fraud. This operational loss event resulted in a run on deposits: in one day, DIB lost about 7% of its deposits base.¹³⁷

6.1 What is Operational Risk?

Operational risk, as the name implies, arises from operational failure. The Basel Committee defines it as “*the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events.*” The Islamic Financial Services Board (IFSB) has expanded on this definition to include exposures that are specific to IFIs, namely Sharia non-compliance and the failure to meet fiduciary responsibilities. Both definitions include legal risk but exclude reputational risk.

Operational risk is not new: it has always posed a threat to financial institutions. What is new is the way banks manage operational risk. Until recently, banks dealt with operational risk through “controls” and mitigation techniques. For instance, they have relied on effective internal controls to reduce the risk of fraud. They also have used automation to overcome human errors. Only few banks attempted to measure operational loss exposures and to allocate operational risk capital. But things have changed. The ‘abnormal’ financial losses suffered by some financial institutions as a result of operational loss events has made banks take operational risk more seriously. Recognizing the importance of sound operational risk management, the Basel Committee decided to introduce a separate capital charge for operational risk as part of the Basel II Accord.

Managing operational risk poses a challenge to financial institutions. The lack of internal and external data on operational loss events makes the quantification of operational risk more difficult. And unlike credit and market risks, operational risks are neither revenue-driven nor diversifiable. They are a part of doing business. Hence, there is no up-side potential to benefit from; only downside risks to manage. Furthermore, the interaction of some operational risks and credit and market risks can result in higher operating costs or lower revenues. For example, an Islamic bank can suffer losses if a customer reneges on his murabaha promise, provided that the bank is unable to return the asset to the original supplier and the price of the object of sale falls.

137 See Warde I. (2000), *Islamic Finance in the Global Economy*, Edinburgh University Press.

6.2 Operational Risk Management Framework

Financial institutions should consider the following key elements when developing a framework for operational risk management (Figure 6.1).

Governance: Setting clear guidelines for the roles and responsibilities of the Board of Directors and senior management in overseeing the implementation of an effective operational risk management.

Policies & Procedures: Developing well-defined policies and procedures for the identification, assessment, monitoring and reporting, and control and mitigation of operational risks.

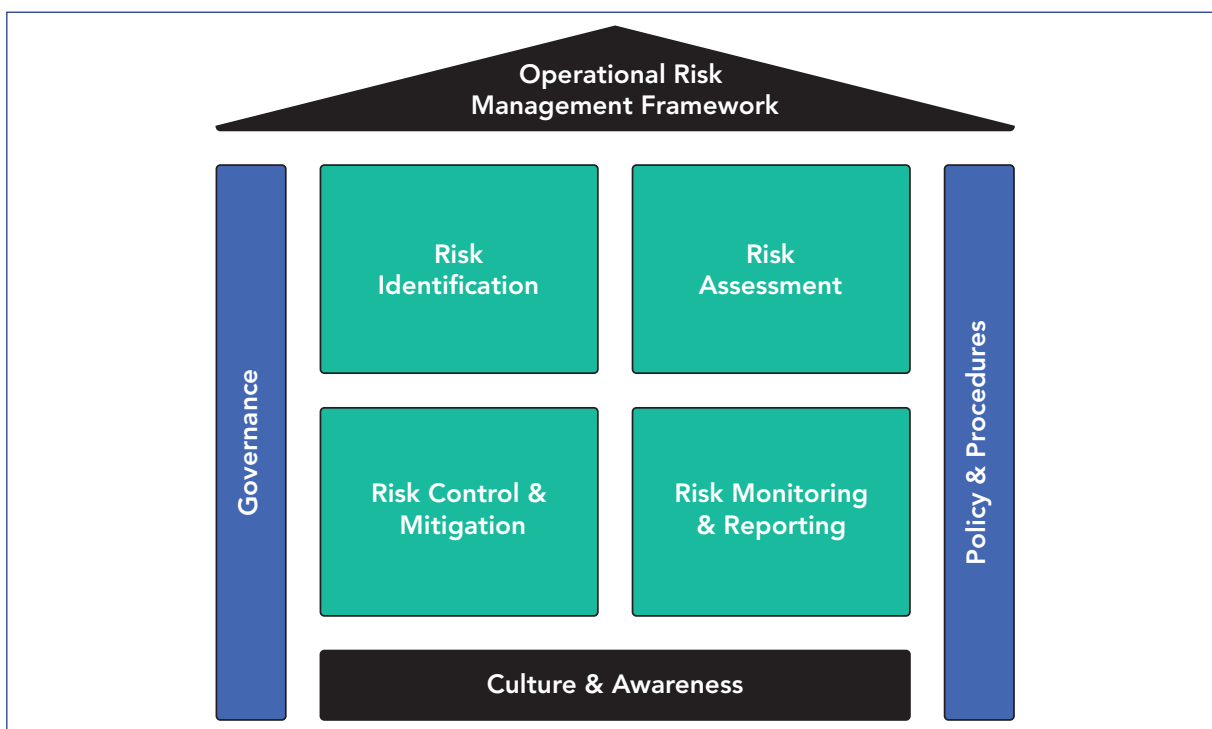


Figure 6.1 Operational Risk Management Framework

Risk Identification: Thoroughly analyzing all products, activities, processes and systems that are susceptible to operational risks allows the identification of all possible loss events and their associated causes.

Risk Assessment: Evaluating exposures, likelihood and severity of the loss events. The loss distribution approach (LDA) is the most popular approach used by risk managers to assess operational risk.

Risk Monitoring and Reporting: Building effective indicators to quickly detect loss events and timely reporting of the outcomes of monitoring activities to senior management and the Board. The report should address the underlying causes of any change in the bank's risk profile along with possible remedies.

Risk Control and Mitigation: Identification of control measures and assessment of their effectiveness in mitigating operational risks. Control measures are determined by the nature of the operational risk. For instance, while banks insure against natural disasters, they rely on internal auditing to mitigate internal fraud.

6.3 Taxonomy of Operational Risks

The Basel Committee on Banking Supervision (BCBS) divides banks' activities into eight business lines for the purpose of operational risk calculation: corporate finance, trading and sales, retail banking, commercial banking, payment and settlement, agency services, asset management, and retail brokerage. For each business line, operational risks are classified into seven event-types as follows:^{138,139}

Internal Fraud: Acts of a type intended to defraud, misappropriate property or circumvent the law or company policy, excluding diversity/ discrimination events, which involves at least one internal party.

Subcategory	Example
Unauthorized activity	Not disclosing (intentionally) in the contract that the subject of a murabaha transaction will be sold to a winery.
Theft and fraud	Charging a low markup on a risky murabaha in exchange for a bribe.

External Fraud: Acts of a type intended to defraud, misappropriate property or circumvent the law, by a third party.

Subcategory	Example
Theft and fraud	Customer breaks his non-binding promise in collaboration with supplier, forcing the bank to sell back the asset to the supplier at a discount ¹⁴⁰

Employment Practices and Workplace Safety: Acts inconsistent with employment, health or safety laws or agreements, from payment or personal injury claims, or from diversity/discrimination events.

Subcategory	Example
Safe environment	Slip and fall accident while inspecting merchandise.

Clients, Products & Business Practices: Unintentional or negligent failure to meet a professional obligation to specific clients (including fiduciary and suitability requirements), or from the nature or design of a product.

Subcategory	Example
Suitability, disclosure, & Fiduciary	Failure (unintentional) of bank to meet murabaha contract specifications.
Product flaws	Murabaha object of sale defects.

¹³⁸ See BSBS (2002), *Operational Risk Data Collection Exercise – 2002*, (Table 1).

¹³⁹ For each category, whenever applicable, we provided a murabaha related example.

¹⁴⁰ Most examples, including this one, summarize real incidents that took place at Islamic banks.

Damage to Physical Assets: Loss or damage to physical assets from natural disaster or other events.

Subcategory	Example
Disasters and other events	Damages to a murabaha object of sale due to an earthquake.

Business Disruption and System Failures: Disruption of business or system failures.

Subcategory	Example
Systems	Accounting software incompatibility.

Execution, Delivery & Process Management: Failed transaction processing or process management, from relations with trade counterparties and vendors.

Subcategory	Example
Transaction capture, execution, & maintenance	A general rebate that the bank receives from the supplier when its purchases exceed a certain threshold is recorded as a customer specific rebate (data entry error).
Customer intake and documentation	Missing binding promise document.

Since there are eight business lines and seven even types, the bank should assess operational risk for all 56 business line/loss type combinations.

6.3.1 Causes, Events, and Consequences

The universe of operational risk consists of three dimensions:¹⁴¹

Event: A risk that could result in losses to the bank.

Cause: Factors that contribute to the event occurrence either through loss frequency or loss severity. In general, factors are controllable.

Consequence: Impact of a risk on bank. A risk event can either result in monetary losses or in foregone income or both.

The first step is to list all possible risk events that a bank could be exposed to. Once all possible operational risk events have been identified, one moves to list event causes before assessing the effects of each event on the bank.

Example 6.1 Cause and Consequence of a Single Event

Signing a murabaha contract to sell equipment to a winery is classified as a Sharia non-compliance event. Inadequate training is the factor that contributed to this particular type of event (cause). In the absence of a clause stipulating that the

¹⁴¹ See Samad-Khan A., *Stress Testing Operational Risk*, Expert Forum on Advanced Techniques on Stress Testing, 2006

agreement is voidable in the event of financing assets that are non-compliant with Sharia, the buyer can go to court to enforce the contract. The bank will be forced to honor its contractual obligations but is not allowed to recognize the markup as income. Moreover, it could be subject to reputational risk if such incidences reoccur frequently (consequence). Adequate training can reduce the chance of Sharia non-compliance (likelihood factor). A non-permissible business activities clause will not prevent Sharia non-compliance events from taking place, but may help mitigate their outcomes (severity factor).

6.4 Operational Risks Specific to IFIs

6.4.1 Sharia Non-Compliance

The IFSB defines Shariah non-compliance risk as “the risk that arises from IIFSs’ failure to comply with the Shari’ah rules and principles determined by the Shari’ah Board of the IIFS or the relevant body in the jurisdiction in which the IIFS operates.” The IFSB definition does not address the case where the Sharia Board itself is at fault due to a lack of information¹⁴².

In either case, failure to comply with Sharia rules and principles can lead to the cancellation of transactions, the non-recognition of income, legal liability and/or reputational damage. Accordingly, IFSB has set a Standard for managing Sharia non-compliance risk.

IFSB Standard - Shariah Non-Compliance Risk

Principle 7.1: IIFS shall have in place adequate systems and controls, including Shariah Board / Advisor, to ensure compliance with Shariah rules and principles.

IIFS shall ensure that they comply at all times with the Shariah rules and principles as determined by the relevant body in the jurisdiction in which they operate with respect to their products and activities.

IIFS shall ensure that their contract documentation complies with Shariah rules and principles.

IIFS shall undertake a Shariah compliance review at least annually, performed either by a separate Shariah control department or as part of the existing internal and external audit function by persons having the required knowledge and expertise for the purpose.

IIFS shall keep track of income not recognized arising out of Shariah non-compliance and assess the probability of similar cases arising in the future.

See Islamic Financial Service Board, *Guiding Principles of Risk Management For Institutions Offering Only Islamic Financial Services*, December 2005.

142 See Lahsasna A., 2014, *Shari’ah Non-Compliance Risk Management and Legal Documentation in Islamic Finance*, Wiley.

Sharia non-compliance can pose three levels of risks:

High-risk: The risk that erroneous contracts cannot be rectified or a transaction must be cancelled which could potentially lead to losses. For instance, a bank can suffer losses if an MPO contract does not include a late payment penalty clause if the customer delays payments.

Medium-risk: These are events that the bank can control or mitigate at reasonable costs. For example, a security that fails to comply with the purification process throughout its holding period but can be liquidated at a reasonable cost.

Low-risk: These are mostly risks that are inherent in daily operations. For instance, failing to disclose (unintentionally) the cost and profit markup in an MPO contract. The contract can easily be rectified with no cost to the counterparties.

Recognizing the importance of managing Sharia non-compliance risk, and the implication of non-compliance on the reputation of Islamic financial institutions, the new Islamic Financial Services Act of 2013 in Malaysia imposes regulatory penalties to ensure compliance with Sharia rules and principles.

Islamic Financial Services Act (2013)

Article 28 (1): An institution shall at all times ensure that its aims and operations, business, affairs and activities are in compliance with Shariah.

Article 28 (3): Where an institution becomes aware that it is carrying on any of its business, affair or activity in a manner which is not in compliance with Shariah or the advice of its Shariah committee or the advice or ruling of the Shariah Advisory Council, the Institution shall:

- (a) Immediately notify the Bank and its Shariah committee of the fact;
- (b) Immediately cease from carrying on such business, affair or activity and from taking on any other similar business, affair or activity; and
- (c) Within thirty days of becoming aware of such non-compliance or such further period as may be specified by the Bank, submit to the Bank a plan on the rectification of the non-compliance.

Article 28 (5): Any person who contravenes subsection (1) and (3) commits an offence and shall, on conviction, be liable to imprisonment for a term not exceeding eight years or to a fine not exceeding twenty-five million ringgit or to both.

6.4.1.1 Sharia Non-Compliance Risks of a Murabaha Transaction

Operational risk events that are specific to murabaha transactions include:

Bilateral Promise: It is permissible only if it is binding to one of the counterparties or to none of them. A binding promise where the customer is bound to buy the good from the bank and the bank is bound to sell it to the customer is similar to a forward contract and therefore is not permissible.

Money exchange: Currency cannot be the object of sale in a deferred payment murabaha contract.

Debt: In some jurisdictions, debt cannot be the object of sale in an MPO. The markup charged by the bank over the principal of the debt is *riba*.

Prepayment: Stipulating in the contract the right to receive discounts for prepayments is not permissible.

Late Payments: Charging a penalty fee for late payment is permissible but cannot be recognized as bank's income.

Rescheduling the debt: Rescheduling the debt is only permissible if there are no extra charges.

Contracts execution: Sequence execution should be in line with Sharia

6.5 Operational Risk Assessment

Assessing operational risk involves the following steps:

1. Collecting data on the frequency and severity of losses by business line/event type. Frequency refers to the number of losses observed over a given period whereas severity represents the magnitude of loss.
2. Modeling loss frequency and loss severity by business line/event type.
3. Combining both frequency and severity distributions using Monte Carlo simulation to obtain an estimate of the aggregate operational loss distribution by business line/event type.
4. Use the quantiles of the aggregate loss distribution to estimate the bank's total risk exposure and subsequently determine the risk capital required by business line/event type.

6.5.1 Loss Frequency Distribution

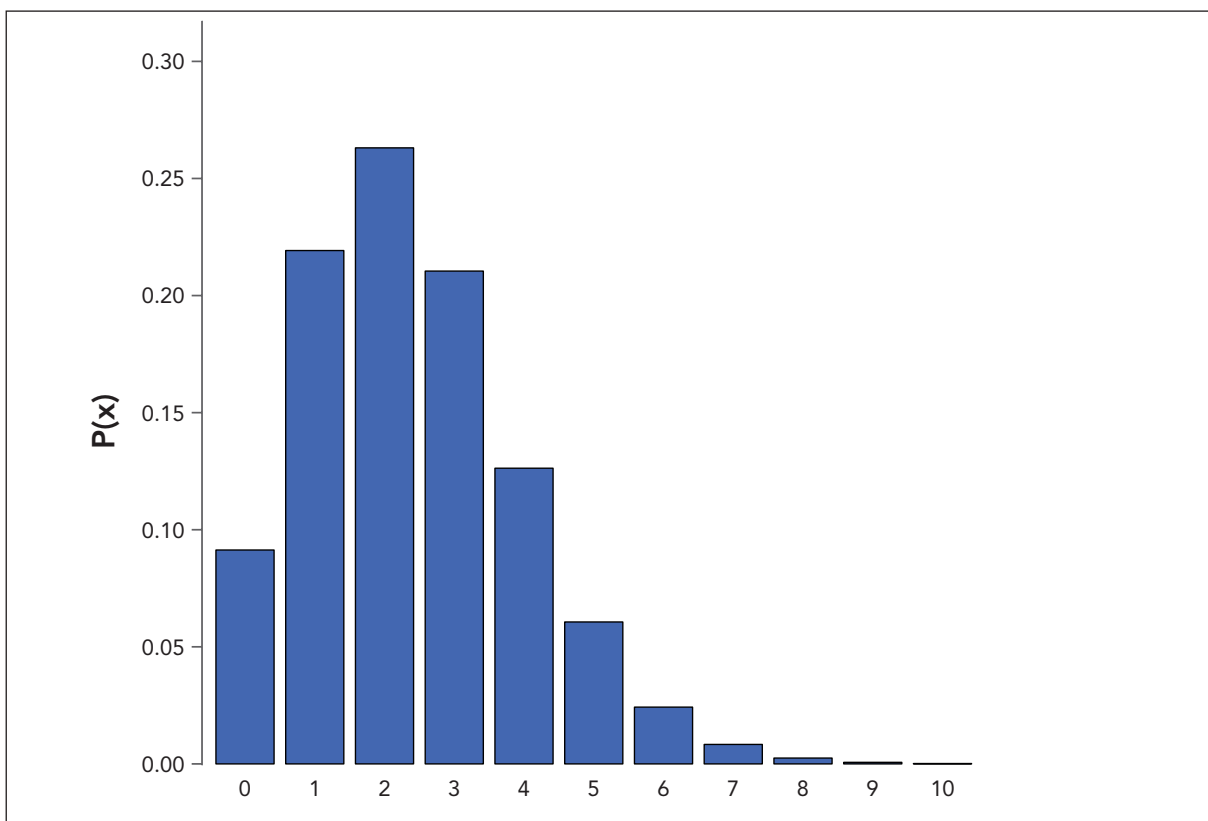
The Poisson distribution is commonly used for modeling loss frequency.¹⁴³ It is a discrete probability distribution used to determine the probability that a certain number of loss events occur randomly within a given period of time.¹⁴⁴

¹⁴³ The Negative Binomial distribution is also commonly used to model loss frequency. The χ^2 -test is used to test the goodness of fit of the statistical model.

¹⁴⁴ The Poisson distribution is a one-parameter distribution: both the mean and variance are equal to λ .

$$P(x) = \frac{e^{-\lambda} \lambda^x}{x!}$$

where λ represents the expected number of loss events per period. For every business line/event type, the average number of losses per year is calculated to derive loss frequency distributions. For example, assume that in corporate finance, twenty four loss incidences of murabaha object of sale defects (*clients, products & business practices* loss event) were reported over the last ten years. This is the equivalent of an average 2.4 loss incidences per year. In this case, $\lambda = 2.4$ is used to derive the loss frequency distribution.

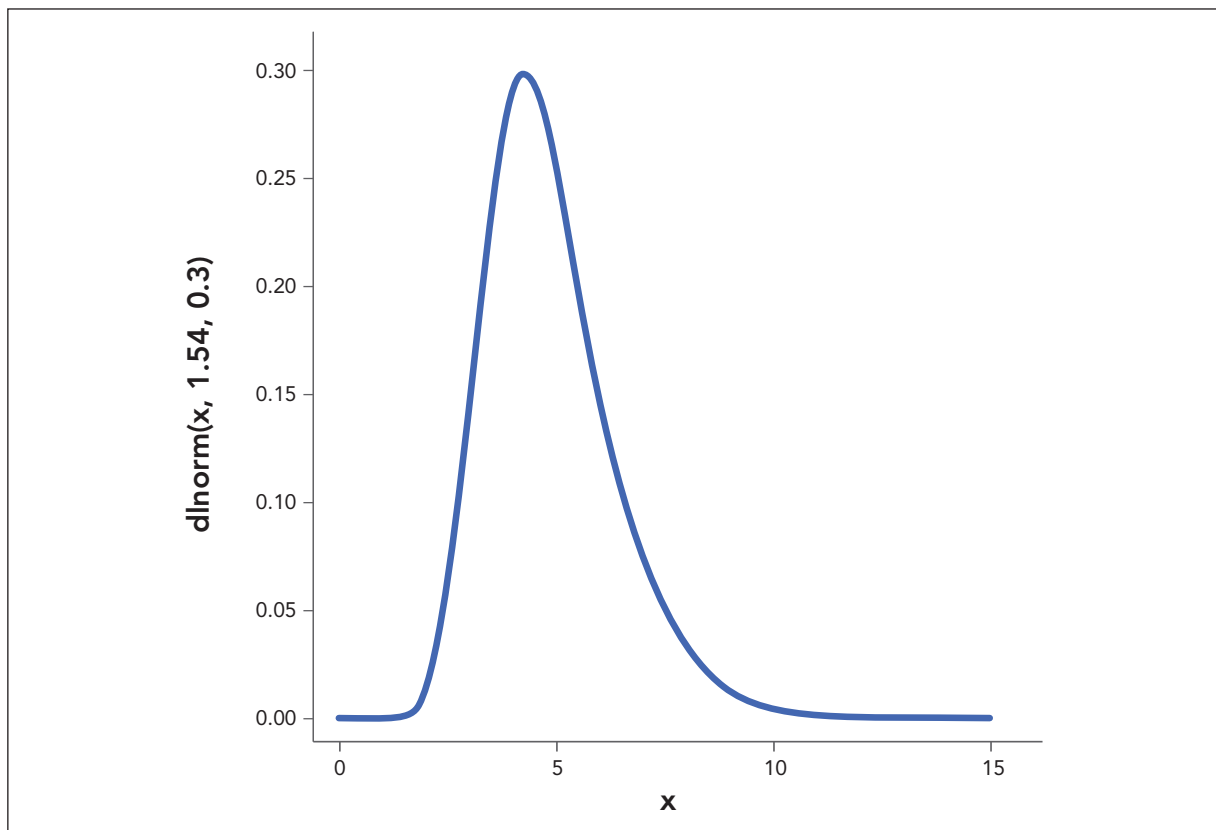


The chance of not having a single incident per year is 9.1% whereas the likelihood of having six or more similar incidents is only 3.6%.

6.5.2 Loss Severity Distribution

Modeling loss severity poses a challenge for a number of reasons including the lack of data, data truncation, and censoring. Many banks model operational risk by fitting data either to the lognormal or

to the Weibull distribution.¹⁴⁵ Assume for example that the lognormal distribution best fit the data and that the mean and standard deviation of the logarithm of defect losses are 3.8 and 0.36 respectively.



The next step is to combine both the frequency and severity distributions to obtain an aggregate loss distribution by business line/event type. The Monte Carlo simulation is used to generate one million random samples of loss frequency and loss severity in order to simulate the aggregate loss distribution. From the aggregate loss distribution, one can determine EL and UL. EL is covered by allowances and risk capital is the difference between VaR and EL. Let us first estimate EL (mean aggregate loss). The mean of the aggregate loss distribution is equal to the product of the means of the loss frequency distribution and the loss severity distribution:

$$mean_{AL} = mean_{LF} \times mean_{LS} = 2.4 \times USD48,743 = USD116,983 = EL$$

On average, the bank incurs a yearly loss of USD 116,983 due to murabaha object of sale defects. To calculate UL, we must first determine VaR's confidence level. The table below summarizes UL estimates for different confidence levels.

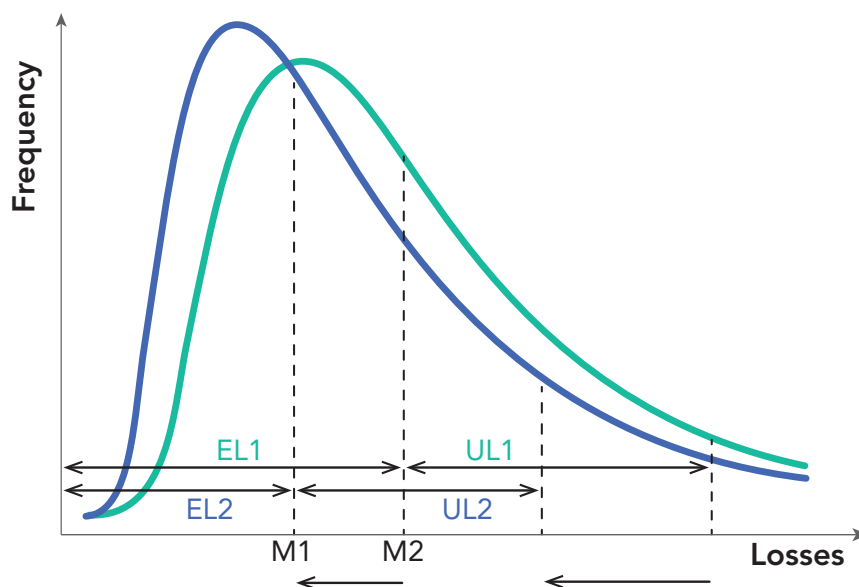
¹⁴⁵ Pareto distribution is also used to model loss severity. Both the Q-Q Plot and the K-S test are used to test for the goodness of fit of the underlying statistical model.

	90%	95%	99%
VaR	\$230,215	\$279,612	\$393,787
UL	\$113,232	\$162,629	\$276,804

Thus, if the bank is targeting a 99% VaR, then it must hold the equivalent of USD 276,804 in capital to cover for unexpected losses.

6.6 Operational Risk Capital

Sound operational risk management can lead to lower risk capital and subsequently to higher return on capital. By reducing the frequency of loss events, business lines will need less capital. As the aggregate loss distribution shifts to the left due to improvements in risk controls and mitigation techniques, both EL and UL are reduced.



Suppose that the corporate finance business line was able to reduce the frequency of defects from an average of 2.4 incidences per year to only 2. In this case, EL is reduced to USD 97,486. Risk capital required is also less for each percentile level.

	90%	95%	99%
VaR	\$197,881	\$246,493	\$363,407
UL	\$100,395	\$149,007	\$265,921

Biographies



Richard Apostolik

President & CEO of the Global Association of Risk Professionals, Inc. (GARP)

Prior to joining GARP in 2002, Rich worked with Bankers Trust's (Deutsche Bank) Strategic Ventures group where he focused on developing financial risk management initiatives designed to provide credit risk mitigation and management services to financial and energy companies. There he was the co-developer of CoVar, a dynamic counterparty credit risk mitigation system while also specializing in advising clients about the broader strategic applications of the use of derivative risk management systems and financial structuring arrangements.

Prior to Bankers Trust Rich was J.P. Morgan & Co.'s global head of energy brokerage activities and COO of its global listed product businesses. Before joining J.P. Morgan he ran his own consulting firm, providing advice on startup operations and management issues to such major investment banks as Deutsche Bank, Fuji Bank, Discount Corporation of New York, Omega Advisors and J.P. Morgan. He was also responsible for the start up and running of S.G. Warburg & Co.'s North American futures and options business.

Rich possesses a Bachelor of Science in Business Administration, an MBA and a Juris Doctor degree from the University of Dayton. He was an attorney with the US Securities and Exchange Commission, practiced law with a private law firm in Chicago and was the Chicago Mercantile Exchange's first House Counsel.



Professor Dr Dato' Mohamad Azmi Omar

Director General of Islamic Research and Training Institute (IRTI), Islamic Development Bank Group.

Prior to joining IRTI, he was the Deputy Rector (Academic affairs) and Professor of Islamic Finance at the Faculty of Economics & Management Sciences, International Islamic University Malaysia (IIUM). He obtained his Bachelor and Master degrees in Finance from Northern Illinois University, USA and PhD from University of Wales, Bangor (UK). He is the author of many publications including a textbook on Fundamentals of Islamic Money and Capital Markets. Professor Azmi had advised a number of Islamic banks, software companies and universities in Malaysia and abroad on Islamic Banking and Finance. He was a member of the Shari'ah Advisory committee at Bank Kerjasama Rakyat Malaysia Berhad (an Islamic cooperative bank) and Amanah Ikhtiar Malaysia (an Islamic microfinance institution). He may be contacted at azmiomar@isdb.org.



Dr. Ahmad Jachi

Global Head of Islamic Finance at the Global Association of Risk Professionals (GARP)

Dr. Jachi previously served as the First Vice Governor of Banque du Liban, the Alternate Governor for Lebanon at the IMF and the National Coordinator for the GDDS Project for the period 2003-2009. He chaired both the Financial Stability Committee and the Islamic Banking Committee.

Dr. Jachi worked on integrating Islamic banking into the Lebanese financial system. Prior to joining Banque du Liban, Dr. Jachi was a member of the privatization committee chaired by the Minister of the Economy.

Dr. Jachi's previous engagements include:

- Developing the Islamic Finance Qualification (IFQ) in collaboration with the Securities and Investment Institute (London) and Ecole Supérieure des Affaires (Lebanon)
- Research consulting for a number of prominent organizations including ESCWA (UN) and HIID (Harvard University)
- President and CEO of Al-Buhous (Lebanon) responsible for advising major corporations on transactions exceeding one billion dollars in total

Dr. Jachi was awarded the AAOIFI 2009 Outstanding Contribution to the Development of the International Islamic Finance Industry



Dr. Hylmun Izhar

Economist at Islamic Research and Training Institute (IRTI), Islamic Development Bank.

Prior to joining IRTI-IDB, he was a lecturer at the Markfield Institute of Higher Education (MIHE), Leicester, United Kingdom where he taught Islamic Financial Instruments, Economic Development and Finance and Cross Culture Management.

Previously, he was awarded a research fellowship at Oxford Islamic Finance, Ltd, a wholly owned subsidiary company of the Oxford Centre for Islamic Studies (OXCIS), Oxford, United Kingdom. He earned his master degree in Islamic Finance with distinction at Loughborough University, United Kingdom (a master degree in affiliation with the Markfield Institute of Higher Education), and obtained PhD in Islamic Finance from Durham University, United Kingdom during which he was honoured a prestigious Doctoral Fellowship by the Graduate School, Durham University.

He is an invited speaker to a number of prominent academic and professional forums and is a peer reviewed author/reviewer of numerous articles.

Having been an active contributor to Muslim World Book Review, Dr. Izhar's academic articles appear in a number of refereed journals such as the Journal of Risk, Review of Islamic Economics, IIUM Journal Economics and Management, Journal of Islamic Banking and Finance, Kyoto Bulletin of Islamic Area Studies, Afro EuroAsian Studies, and Islamic Economic Studies.

Dr. Izhar remains actively engaged in professional life, amongst others; through delivering professional training course for industry players in the following areas

1. Operational Risk and Shariah Compliance in Islamic Financial Institutions,
2. Advanced Shari'ah Compliant Product Innovation and Development,
3. Risk Management in Islamic Financial Institutions,
4. Capital Adequacy Frameworks in Islamic Financial Institutions, and
5. Islamic Finance: Origins, Current Trends and Future Challenges.

Participants who benefited from my professional training course include bankers, lawyers, professionals, and government officials from the Ministry of Industry and Trade and the Committee for Small and Medium Enterprise, Kazan, Republic of Tatarstan; Standard and Poor's Rating Agency London, Bosnia Bank International Bosnia and Hercegovina, Bank Islamic Brunei Darussalam, Islamic Development Bank Jeddah Saudi Arabia, International Bank of Azerbaijan, the Capital Market Authority Tanzania, Amanat Holding Company-Ufa Bashkortostan, the Ministry of Finance, Government of Tanzania, OCBC Al Amin Bank Berhad Malaysia, , Bank Rakyat Malaysia, Permodalan Nasional Berhad (PNB) Malaysia, Bank of Tanzania, MNRB Holding Berhad Malaysia, AIA Public Takaful Malaysia, AmBank Berhad Malaysia, EKVITA Law Firm Azerbaijan, and Central Bank of Iran.

Some of his recent accomplishments include his active involvement in the World Bank Group's Technical Assistance to the Government of Tanzania and the development of the Mid-term Review (MTR) of the Islamic Financial Services Industry Development: 10-Year Framework and Strategies, a project in collaboration with the Islamic Financial Services Board (IFSB).

Sponsor Biographies

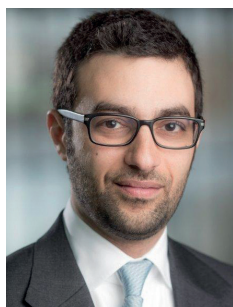


Adnan Ahmed Yousif

President & Chief Executive, Al Baraka Banking Group

Al Baraka Banking Group, which is one of the largest Islamic Financial Institutions in the world, with international presence, is pleased to lend its support to the Initiative of the Global Association of Risk Professionals (GARP) and the Islamic Research and Training Institute (IRTI) of the Islamic Development Bank (GARP – IDB/IRT Risk Initiative) and cooperate with other risk experts in the Oversight Committee of this important project. Risk Management is an integral part of the Al Baraka Group's decision-making process with the Board of Directors setting the Group's Risk Appetite and related Risk Policies.

Al Baraka Banking Group is committed to complying with internationally established principles and policies in relation to risk management and in particular, it fully subscribes to the guiding principles set down by the Islamic Financial Services Board. Among Al Baraka's key objectives for risk management are the professional development of qualified staff and continued enhancement and refinement of the process of risk identification and measurement and risk mitigation. This is accomplished by Al Baraka on its own, as well as in partnership with leading standard setting and regulatory bodies and other Islamic Financial Institutions. Accordingly, Al Baraka enthusiastically accepted the invitation by GARP – IDB/IRTI to cooperate with them as well as others on the risk initiative. Al Baraka is very pleased to see the successful completion of Phase One of this project.



Tamim Al Kawari Chief Executive Officer

Tamim Al Kawari joined QInvest from Goldman Sachs where he was a Managing Director and Country Head for Qatar. As well as his role as CEO, Mr Kawari also heads the Principle Investments team.

Prior to joining Goldman Sachs, Mr Kawari was the Chief Financial Officer for Qatargas' Transport Company, Nakilat. At Nakilat he implemented a US\$ 8 billion program to finance 27 liquefied natural gas (LNG) vessels that ship LNG from Ras Laffan to customers worldwide.

Prior to joining Nakilat, Mr Kawari served as the treasurer for the Qatargas Company. Earlier in his career he also worked as a trader at Qatar National Bank, where he traded a range of financial products.

Mr Kawari holds a BA in International Business with a minor in Political Science from George Washington University and an MBA from the American University - Washington, D.C.

Islamic finance is an incredibly complex and rapidly developing industry, with new risks emerging each and every day. As a practitioner, it is essential that you are able to effectively identify and value these risks in order to make the right investment decisions.

One of the major challenges facing Islamic financial institutions is not just ensuring that risk management keeps up with the development of the industry, but actually making sure that it is one step ahead. This is made even more complicated by the lack of harmonised risk management processes and protocols.

Initiatives such as this are incredibly important for the sustainable development of the industry. I am delighted that QInvest was able to be involved and I am eager for the firm to play its role in nurturing the growth of the industry.

Tamim Al Kawari





Bernard Barbour

Head of Legal, Compliance & Sharia'a Affairs, Company Secretary

Bernard Barbour joined QInvest after serving as a Senior Attaché in the Legal department of the Central Bank of Lebanon. He joined the Central Bank of Lebanon as a Legal Counsel in Financial Products and e-banking and was later promoted to Head of Financial Products and e-banking.

Mr. Barbour has more than 17 years of extensive experience in financial legal systems and garnered from legal regulatory exposure and an academic teaching career in financial, fiscal and contract law in the three leading universities of Lebanon. He was responsible for drafting the Islamic Finance Regulatory and Legal Framework in the Republic of Lebanon, legislative propositions to payment systems such as credit cards debit cards, settlements, clearing E-checks, E-money and netting among others.

Mr. Barbour holds an LLM degree in European law from Lausanne University, Switzerland, and an LLM degree in International Economic Law from Geneva University, Switzerland, a B.A. in Law from the Lebanese University, and a Diploma in English Legal Methods from Cambridge University, England. Mr. Barbour is fluent in Arabic, French and English.

"O you who have believed, when you contract a debt for a specified term, write it down." Surat Al-Baqarah 282

Islamic financial institutions are not only bound by the legal framework of their conventional counterparts but also that of Sharia law. As the industry continues to innovate and develop new products and structures, the legal risks associated with Islamic banking need to be managed accordingly. As anyone involved in Islamic banking will know, the ethical nature of the industry and the complex contractual set up expose it to a great deal of interpretation, making the legal risks even more complicated. This booklet will cover some of the key issues and considerations associated with legal risk and Islamic banking.

It gives me great pleasure to be involved in this initiative, which is playing an important role in reinforcing, enhancing and standardising best practice risk management for the Islamic financial institutions industry.

Bernard Barbour





Mohammed Ebrahim Mohammed

Chief Executive

Mohammed Ebrahim Mohammed has over 36 years' experience in banking and financial services. He took up his current position with BisB in 2007. Prior to this, he was the Chief Executive Officer of CrediMax, having started his banking career with Chase Manhattan Bank, Saudi National Commercial Bank and Bank of Bahrain & Kuwait. Mohammed is a Board Member of the Liquidity Management Centre. He holds an MBA from the University of Glamorgan, Wales, UK; and attended the Gulf Executive Development Program at Darden School of Business, University of Virginia, USA and Management program with Harvard University, Boston, USA.



Dr Mohammed Belgami

Head of Credit and Risk Management.

Dr Mohammed Belgami has over 30 years' of international experience in the fields of credit analysis, risk management, valuation, due diligence and financial management; and research and academia. He joined BisB in 2008 and took up his current position in 2013. Prior to this, Dr Mohammed held senior management positions with the Saad Trading, Contracting & Financial Services Company, and Kuwait Finance House – Bahrain; as well as academic positions with institutions in Bahrain and India. A Financial Risk Manager from the Global Association of Risk Professionals, he holds a Doctoral degree and Master's and Bachelor's degrees in Finance & Accounting and Commerce. He is an invited speaker at regular forums on Basel II and III and Risk Management.



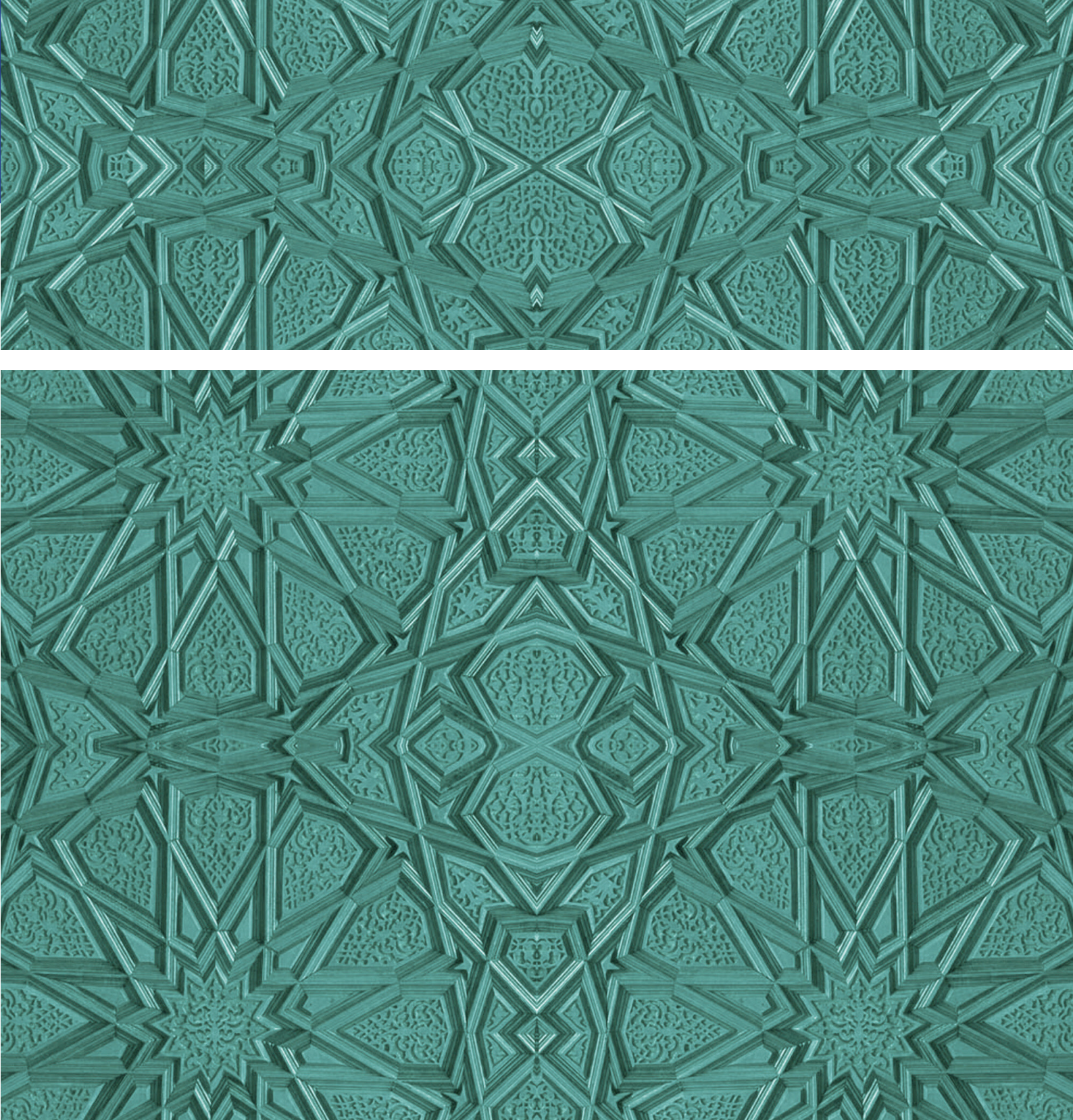
Dr. Jamil El Jaroudi

Chief Executive Officer – Bank Nizwa, Oman

In April 2012 Dr. Jaroudi was appointed as the first CEO of Oman's first Islamic bank, Bank Nizwa.

Dr. Jaroudi started his gulf experience in the 1970s as a consultant with Booz Allen & Hamilton, in the UAE and the Kingdom Of Saudi Arabia, after which he held various senior executive roles with Al Mawarid Group, Saudi Arabia. In 1996 he co-established the Middle East Capital Group in Lebanon, the region's first merchant bank with a pan-Arab focus. Subsequent to this Dr Jaroudi held senior positions with DMI Trust, Islamic Investment Company of the Gulf and Shamil Bank, and was involved in the establishment of Arab Finance House in Lebanon and most recently Elaf Bank in Bahrain, where he was the chief executive officer.

Dr. Jaroudi holds an MBA from the Ivy League school Columbia University, and a PhD in Finance from Kellogg School, Northwestern University, USA. Among other activities for NGOs and charitable organizations, he is a Board member of the Beirut Islamic University, a member of the Board of Trustees of the Lebanese American University Institute of Family Businesses and, a member of the Governing Council of INCEIF, the Global University of Islamic Finance in Malaysia. Recently Dr. El Jaroudi was invited to join the Global Islamic Financial Investment Group overlooked by the UK Minister Baroness Warsi with the objective to develop Islamic finance in London.



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