

to some estimates, by 1988 they had managed to attract about half a million customers and had deposits of between 4.5 and 8 billion Egyptian pounds.

The rate of return offered was so attractive that money flew out of the regular banking sectors, and, in some cases, investors created arbitrage by borrowing from banks and investing in these companies. However, these companies were not subject to any regulation and supervision, and their operations lacked transparency. These investment companies and their activities were exposed, however, in 1988 when the government decided to regulate the sector by requiring full disclosure of their accounts and investment activities. This regulation triggered the failure of several companies and the closure of the majority. Below is a summary of the issues pertaining to this case study.

- It appears that the investment companies were not following *Shari'ah*-approved modes of investment, despite their claims. In some cases, they were paying high returns by drawing on a continuing high level of deposits, as opposed to actual profits.
- It was reported that investments of a speculative nature were made in international currencies and financial markets. When the prices collapsed in international markets in 1987, many investment companies suffered losses. A major portion of funds were invested in illiquid sectors of construction, tourism, housing, and book publication (mostly Islamic publications). Several investment companies maintained close business partnerships with other trading companies and managed a number of subsidiaries. In short, funds were used to finance the businesses of subsidiaries and partner trading companies.
- Official audit reports discovered many irregularities and funds unaccounted for, partly in complex transactions with subsidiaries. Authorities began the investigation of select investment companies for criminal charges.

Several lessons can be learnt from these three case studies. First, the main cause of the failure in all three cases was irresponsible management and bad supervision and governance. Second, there were lapses in both regulation and supervision. There were improper regulatory frameworks, and in all cases the regulator failed to anticipate the trouble in time. Third, these financial institutions were clearly engaged in activities that were against the basic teachings of Islam on contracts, property rights, justice, trust, and honoring commitments. Fourth, in all cases, none of the Islamic financial instruments were questioned or gave rise to concern. Finally, in all three cases, significant reputational risk resulted and the stakeholders' confidence was seriously damaged. The public's trust was broken, regulators became more suspicious and cautious, and opponents were provided with fuel to criticize even a legitimate effort to establish a financial institution compliant with *Shari'ah*.

It should be reiterated, though, that these failures arose from a combination of gross mismanagement, poor governance, negligence, misconduct, and

misrepresentation,<sup>12</sup> and were in no way attributable to the special nature of Islamic financial institutions per se. Indeed, during the past three decades—including the current financial crisis—no major Islamic bank has failed where the failure can be attributed to their special form of intermediation.

## ENDNOTES

1. [http://www.erf.org.eg/cms.php?id=publication\\_details&publication\\_id=648](http://www.erf.org.eg/cms.php?id=publication_details&publication_id=648)
2. Čihák and Hesse (2008).
3. Sairally (2007).  
For example, within the SRI literature, we note that Business in the Community (BITC)—a movement with a core membership of 650 companies across the UK—established a corporate responsibility index in 2002. This BITC Index functions in a similar way to other ethical and social indices, such as the FTSE-4Good, the Dow Jones Sustainability Index, and the Domini 400 Social Index, in that it publicly ranks major international companies according to their SEE performance.
4. *Ibid.*
5. IIRA (2009). The sample of key Islamic commercial banks included Al Baraka Islamic Bank Bahrain (Albaraka), Al Salam Islamic Bank Bahrain (Al Salam), Bahrain Islamic Bank (BisB), Dubai Islamic Bank (DIB), Jordan Islamic Bank (JIB), Khaleeji Commercial Bank (KCB), Kuwait Finance House Bahrain (KFH) and Meezan Bank Pakistan Limited (MB).
6. For a very detailed analysis, see Ali (2007).
7. *Ibid.*
8. Shares of Ihlas Group were suspended from trading, driving the stock market down 4.9 percent in one day; see Starr and Yilmaz (2006).
9. Ali (2007).
10. Okeahalam (1998).
11. Zuhaida (1990); Hasan and Dridi (2010); Beck, Demirgüç-Kunt and Merrouche (2010).
12. See Askari, Iqbal, and Mirakhor (2008) for case studies on the failure of financial institutions offering Islamic products.

## CHAPTER 12

# Financial Engineering

**F**inancial engineering and innovations are the forces driving the global financial system toward the goal of greater economic efficiency. The 1980s witnessed the rapid introduction of financial innovations in the international markets. Financial innovations transformed the traditional financial and banking markets into highly sophisticated markets featuring a high degree of liquidity and a wide array of instruments to share and transfer various sources of risk. The trend occurred in both domestic and international financial markets. The demand for liquidity-enhancing and risk management instruments was prompted by the increased volatility in financial asset prices arising from the breakdown of the fixed exchange-rate system, the oil shocks, excessive government spending and inflationary policies. The innovation and growth in financial markets was further induced by advances in theory, breakthroughs in the information-processing and communication technology and deregulation of markets.

Financial engineering involves the design and development of innovative instruments and processes, as well as the search for creative solutions to problems in finance. Financial engineering may lead to a new consumer-customized financial instrument, or a new security, or a new process which ultimately results in the lowering of funding costs or in increasing return on investments or expanding opportunities for risk sharing. The types of financial-innovation activities that have the most significant impact on the markets are those that:

- Enhance liquidity. Marketability, negotiability, and transferability of financial claims create liquidity by expanding the menu of options available to market participants.
- Transfer and share price and credit risk through the development of derivatives markets. Derivatives, apart from risk sharing, make markets more complete and create important additional social benefits such as the dissemination of uniform prices upon which investment decisions can be made, and the lowering of transaction cost in the capital markets.
- Generate revenues from credit and equity.

Financial development and innovations have had a positive impact on the economic growth of various countries. One of the advantages of financial engineering is that it is for the common good and that there is no copyright on financial products. Once an instrument is launched, it can be copied by anyone, improved upon, combined with other instruments and re-launched.

In addition to broadening choice, financial engineering facilitates the transformation and reshaping of risk. It thus supports the development of new products that break down, transfer and pool risks to match the needs of users. The development of new financial instruments has created opportunities for households and companies to improve their management of financial, liquidity, market, and credit risks, which has facilitated the smoothing of inter-temporal consumption and investment across space.

Financial engineering has also been used often to exploit and to overcome investment regulations applied to US institutional investors. The investment regulations may restrict exposure to certain asset classes, or to an investment-grade credit rating, or preclude exposure to foreign exchange risks or foreign credit risk. For example, a fixed-income manager's investment guidelines may prevent investment in equities but a desirable exposure to equities may be achieved through a structured note where a fixed-income security has embedded exposure to returns in equity markets; thus achieving a play in equities markets and still complying with regulatory requirements.

## **FINANCIAL ENGINEERING IN THE ISLAMIC FINANCIAL SYSTEM**

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Financial engineering is one of the most critical current needs of Islamic financial markets in general and of Islamic risk management practices in particular. IFIs are still operating on traditional instruments, which do not fully satisfy market needs for liquidity or for risk and portfolio management. The asset portfolios of IFIs predominantly consist of trade-related short-term assets. There is a shortage of products for medium/long-term maturities, as secondary markets lack depth and breadth.

The lack of efficient secondary markets and liquidity in the Islamic financial markets has indirectly limited the range of maturity structures available to the investor. Given the absence of liquidity, IFIs cannot easily expand portfolios across capital markets and are restricted in opportunities for portfolio diversification. This presents a challenging opportunity of developing highly liquid instruments to satisfy the demands of the investors and the users of funds seeking longer maturity structures with the flexibility of adjusting portfolios at the lowest cost.

The absence of risk management tools will continue to have a significant impact on the current and future growth of the market because:

- A firm in the Islamic financial markets will lose its business competitiveness because of its inability to handle variability in its cost, revenues and profitability through managing financial risk
- A firm without active risk management will be perceived as a high-risk firm and thus will be subject to higher funding costs
- A firm will be subject to high risk of financial distress
- A firm will be exposed to a higher risk during a system-wide financial crisis
- It will be difficult for IFIs to integrate with the international financial markets.

The key to the rapid development of secondary markets and of liquidity-enhancing products for implementing effective risk management is the application of financial engineering.

The pace of financial engineering in Islamic finance has been very slow by comparison with the conventional system. There are several reasons for this slow growth.

As an emerging market, the focus has been on establishing intermediation services and attempting to get recognition in international financial markets. Therefore, there has been more emphasis on ironing out the basic functionality of the banking and financial systems and the corresponding regulatory and standard-setting framework.

Second, introducing a new, *Shari'ah*-compliant, product requires considerable effort as it has to receive approval from *Shari'ah* scholars, not all of whom are necessarily well-versed in economics and quantitative finance. As we will see in the next section, the *Shari'ah* has not established a clear stand on the permissibility of derivatives, which have played a key role in advancing financial innovation.

In addition, all attempts at financial engineering have revolved around replicating a conventional security that is easily recognizable by investors and borrowers. However, it is sometimes easier to develop new products than trying to replicate a conventional security, which may lead to more confusion and questions about the product.

Finally, although academic research on Islamic economics and finance has made healthy progress, it has not developed fully to the point where it is able to tackle certain critical issues such as asset pricing, risk premium, risk mitigation, hedging, and so on.

All these factors have combined to slow down the introduction of new products in the Islamic financial market.

### **Scope of Financial Engineering**

The process of financial engineering can be viewed as a process of building complex instruments utilizing basic building blocks or unbundling and repackaging different components of existing financial instruments such as return, price risk, credit risk, country risk, and so on. Today's highly liquid instruments and derivatives are based on a simple and basic set of instruments.

A close scrutiny of the instruments underlying the Islamic financial system reveals that these instruments have characteristics similar to many of today's basic building blocks and it is a matter of designing more complex instruments without violating any of the boundaries defined by the Islamic system.

The process of financial innovation is complex and sensitive, as it requires multi-disciplinary considerations involving not only knowledge of economics, finance and banking, but also a deep understanding of Islamic jurisprudence. Throughout history, pious Muslim businesses and traders have worked closely with *Shari'ah* experts, and centuries of experience across several geographical regions have grown into a rich body of *Shari'ah* rulings and precedents in the area of business and economics. However, the process of innovative application of the *Shari'ah* through *ijtihad* to resolve the problems of the time has been dormant for a long time and there is a need to revive a practice that was once alive and vibrant.

The process of determining the legitimacy of a new product involves approval by *Shari'ah* scholars who ensure that the new product does not violate any of principles of the *Shari'ah*. From a legal point of view, any instrument is acceptable as a legitimate financial instrument provided it does not incorporate certain elements considered unlawful in Islam.

Suwailum (2006) suggests four guiding principles for financial engineering: two concern the objectives—balance and integration; and two concern methodology—acceptability and consistency. Here, we extend his ideas to bring some additional principles which would influence the process and practices of financial engineering.

**Adherence to the Essence and Spirit of *Shari'ah*** The *Shari'ah* is not just a set of laws; such laws have well-meaning objectives, commonly referred to as the objectives of the *Shari'ah* (*maqasid-al-Shari'ah*). These are designed to implement the essence or the ideology of Islam, which primarily revolves around promoting unity, social justice, social welfare, the preservation of property rights, and economic development. Therefore, any attempt to develop a product or process that runs counter to these core objectives will not be acceptable. However, by keeping these objectives in sight, financial engineering will lead to an increase in overall social welfare.

The objectives of the *Shari'ah* provide the first line of defense against the introduction of any innovation that is deemed to have the potential for being counterproductive under any market conditions. For example, financial engineering cannot result in any product that leaves either lender or borrower open to exploitation by the other under some market conditions. Before approval can be given for any innovation, there would have to be an impact assessment at the macro level. Although this would not be an easy task as it involves subjective and qualitative judgment, the consistent application of the core principles would serve that purpose.

**Freedom of Contract** An understanding of the laws governing contracts in Islam is critical. Individuals have wide freedom of contract and the

contracting parties are free to engage in any transactions not prohibited by the *Shari'ah*. In other words, any transaction is permissible so long as it does not contain any of the prohibited elements of *riba*, *gharar*, *qimar* and *ikrah*. Historically, *Shari'ah* scholars would not dictate how a contract should be formulated, but it was a common practice by economic agents to bring a contract to the *Shari'ah* scholar who could only declare its legitimacy or non-compliance by testing for the prohibited elements. If the *Shari'ah* scholar did not find any of the prohibited elements, the contract was given the blessing of compliance. This practice implies that rather than imposing restrictions on the contracts, *Shari'ah* gives freedom of contract to the parties so that they can develop new tools and mechanisms of financing and lending, and the role of the *Shari'ah* scholar is limited to ensuring that the contract is valid. Financial instruments and services should be viewed as sets of contracts, which identify the rights and obligations of each party. The *Shari'ah* scholar can examine the contract to verify that these rights and obligations are preserved according to the notions of contracts and property rights in Islam.

This simple principle has significant implications. It means that the basic contracts can be used to build more complex building blocks, opening up the possibility of spanning products to meet customized risk/return profiles. This contradicts the common impression that *Shari'ah* rules hinder creativity and the expansion of financial products and services. Islam encourages entrepreneurship, which signifies risk taking, innovation and creativity that will encourage financial products, processes and services which promote risk sharing and equity participation.

**Availability of Basic Building Blocks** Almost all of the complex financial instruments in today's conventional financial markets can be broken down to a set of basic instruments. For example, a floating-rate bond with a cap and floor on its coupon is nothing but a plain-vanilla floating bond with a call and a put option. Even call and put options can be replicated using cash and fixed-income instruments. No effort to introduce financial engineering into the Islamic financial system can take place without an understanding of the basic building blocks of that system and the principles that can be applied to build more-sophisticated instruments.

**Customizing Risk/Return Profile** It is also critical to develop an understanding of the spectrum of the risk/return profiles of different financial instruments. Often the Islamic financial system is equated with an all equity-based system, which ignores the fact that the system also has several other types of contracts which are not based on profit/loss-sharing. Like sales, trade financing and leasing contracts constitute a large portion of the system, but these are not based on equity and have a risk/return profile that is very similar to a conventional fixed-income security—a vital part of the more exotic financial instruments. While the instruments based on *murabahah*, *salam*, or *ijarah* contracts may resemble an interest-bearing, fixed-income

instrument, these are allowed and recognized by the *Shari'ah* and carry different risk/return characteristics. As discussed earlier, the introduction of securitized assets will exploit these instruments to design and customize risk/return profiles that are critical for the efficient construction and management of portfolios.

**Promotion of Risk Sharing and Reduction of Leverage** The prohibition of interest in Islam curtails the creation of leverage through debt. Instead, the system promotes a balanced sharing of risks and rewards through equity- and partnership-based financial contracts. Following these principles, the financial engineer will focus on developing products which promote risk sharing through making full use of equity (*musharakah*) and partnership (*mudharabah*) contracts. Not having access to debt, the financial engineer will find it difficult, if not impossible, to create leverage.

**Materiality and Linkages** The founding principle of Islamic economics is to promote the real sector—that is, goods and services—and to link the financial sector to it as closely as possible. *Shari'ah*, therefore, insists on the integration of the two sectors to achieve balanced and sustained economic growth. If they are not coupled well, transaction costs increase and efficiency suffers. Financial engineering in Islam will focus on innovations which promote real-sector activities and offer innovative ways to finance these activities. By using risk-sharing contracts, the financial engineer will rely on asset-linked securities through the securitization of real-sector assets. *Shari'ah* rules concerning ownership also ensure that there is clarity in asset ownership by the investor and thus the issue of “remoteness” of assets and ownership witnessed in the conventional system will be minimized.

**Transparency and Simplicity** Financial engineering in the Islamic financial system seeks to eliminate *gharar* through advocating the reduction of asymmetrical information between the parties. Products would be designed to avoid having excessive uncertainty regarding the future payoffs and risks for either party. Where there are unknowns, these would be fully disclosed at the time of the contract. A judicious application of this principle will make the products transparent and will reduce their complexity.

### **Different Approaches to Financial Engineering**

The principle of financial engineering to introduce advanced financial instruments can be applied in the following ways:

**Reverse Engineering or “Wrapping”** The first approach entails taking an existing instrument in the conventional system and evaluating each of its components to find the closest substitute from the basic set of *Shari'ah*-approved instruments. This means breaking down the instrument and then rebuilding



it, using equivalent instruments from the set of *Shari'ah*-approved instruments. This approach is very similar to a common practice where conventional instruments are disguised under *Shari'ah*-friendly names such that *Shari'ah* “wrapping” takes place around the conventional instruments to produce an Islamic instrument.

The major advantage of this approach is the instant recognition and understanding it gets from the practitioners of conventional finance; this paves the way for efficiency and the integration of Islamic financial markets into the conventional system. This approach may be used for determining the legitimacy of a product when it is introduced into a conventional market. This will make it easy for the regulatory authorities of the host country to understand the instrument, which will facilitate its speedy approval. Extreme care is required in this approach in order to avoid any misidentification of close substitutes. Any misidentification or use of a wrong substitute can not only break the trust of investors, but will also create a reputation risk for the industry. All efforts should be made to avoid any contamination from instruments that are close substitutes but not fully *Shari'ah*-compatible. Contamination may occur when an Islamic instrument or contract is used where its intended usage is either doubtful or questionable, or some important features or conditions of the contract are compromised. This danger of contamination will increase as the level of complexity of the instrument increases.

**Innovative Engineering** A second approach to financial engineering, preferable in principle to “reverse engineering,” is to design instruments *de novo* from an established menu of Islamic instruments. The result will be a new array of instruments, each with a unique risk/return profile, that can be bought and sold in specialized markets compatible with *Shari'ah* principles. Since this approach requires a deep understanding of the Islamic economic and financial system as well as the risk/return characteristics of each basic building block, it is a long-term solution and requires extensive research and commitment. Although this approach is better aligned with the essence of the *Shari'ah*, pioneering new frontiers in a different paradigm always poses new challenges and takes time. Some of the prerequisites of or for an Islamic financial system, such as efficient markets, information symmetry and *Shari'ah*-compatible property rights and regulatory and supervisory laws, are absent from most of the developing Islamic countries.

Although this second route is, in principle, the better approach, operational difficulties associated with it impose constraints and force compromises. It is conceivable that given the pressing need for innovation, the first approach will dominate in the short term, and that some combination of the two approaches will be adopted in the medium term. However, the full potential of the system will only be achieved if serious efforts are made to introduce new instruments that provide unique risk/return characteristics that are equally desirable for Islamic and non-Islamic financial markets.

## STRUCTURING TAMWEEL SUKUK

The Tamweel *sukuk*—a \$210-million secured floating-rate note issued by Tamweel Residential ABS Ltd in July 2007—is said to be the first international real-estate mortgage-backed security (RMBS) from the six countries of the Gulf Cooperative Council (see Figure 12.1).

Tamweel's objective was to move part of its residential financing portfolio which consisted of *Shari'ah*-compliant mortgages based on the *ijarah* structure off its balance sheet so that the funds could be used elsewhere. According to the *ijarah* arrangements, customers would lease a villa or apartment from Tamweel and make periodic rental payments. At the end of the lease, if all of the rental payments had been made, the lessee (owner) would obtain the title to the property.

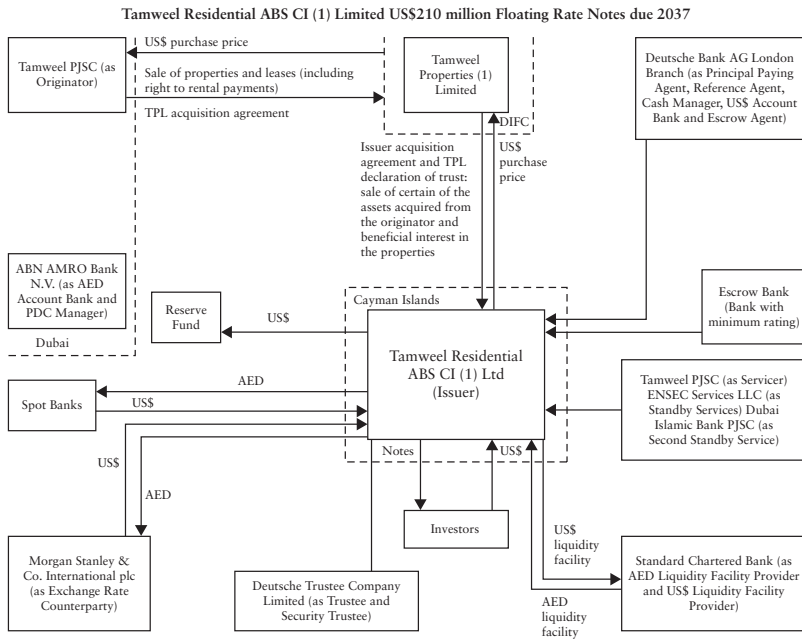
The Tamweel Class A *sukuk* were structured in such a way that they would pay a variable return rate to investors of one month US\$ Libor +35bps. The *sukuk* received an Aa2 rating from Moody's Investors Service and AA from Fitch Ratings Limited, which are among the highest international ratings achieved thus far in the Middle East and North Africa region.

### Objective

As a *Shari'ah*-compliant home finance provider, Tamweel required a range of innovations and adjustments to conventional securitization structures that would allow them to accommodate residential leases rather than mortgage loans as the securitized assets. This meant that the securitization vehicle took on continuing obligations as lessor under the residential leases, which required further tailoring procedures.

From a *Shari'ah* compliance perspective, the challenges of structuring were that the investors could only have recourse to the underlying assets; there had to be a liquidity facility; and, as the revenue stream was in UAE dirhams and the issue was to be in US dollars, there had to be some form of hedge against currency-exchange risk.

**Structure**



**FIGURE 12.1** The Tamweel *sukuk*

**Key Features of *Sukuk***

***Recourse to assets***

Under *sukuk* the investors become the owners of the pool of financial assets and the revenues and returns generated by those assets is their sole payment source. Most *sukuk* issued in the market have involved investors acquiring assets but not having full ownership of the underlying asset or based on a promise by the issuer to buy the underlying asset at a predetermined price. In other words, the main focus of the investors has been the creditworthiness of the issuer, rather than the value of the underlying assets. Because of this disconnect, *sukuk* have often been labeled as asset-backed, rather than asset-linked. A statement issued by the AAOIFI has raised concerns about the use of such structures.

The Tamweel issue, however, did not have any type of predetermined purchase undertaking and also ensured that the title to the assets has

(Continued)

## STRUCTURING TAMWEEL SUKUK (CONTINUED)

passed to the investors, with no recourse back to the originator (other than in limited circumstances, such as misrepresentation).

In this respect, the Tamweel structure was considered more compliant with the requirements of both the customer and the rating agencies, and also fell within *Shari'ah* parameters.

### **Multi tranches**

Structuring multiple tranches of securitization to cater to investors of different levels of creditworthiness is common practice in conventional securitization. However, replicating the same in a *sukuk* structure is a real challenge because of *Shari'ah* requirements that all investors are treated equally. In the case of Tamweel, *Shari'ah* scholars were convinced that such tranching was possible without violating *Shari'ah* principles. This was done by arguing that it was possible for the investors to agree to subordinate their interests so that different classes of investors obtained differing returns and at different times.

### **Liquidity facility**

Another interesting feature of the Tamweel *sukuk* was the introduction of a liquidity facility to cover any delay in the collection of rentals from the underlying leasing agreements such that the flow to investors was not disturbed. This was achieved by applying a *qard-ul-hassan* mode of financing.

### **Currency-exchange mechanism**

The cashflows from the rental payments were denominated in UAE dirhams (AED), whereas the *sukuk* was denominated in US dollars, which give rise to classic exchange-rate mismatch risk. This risk was mitigated by ensuring that in the event of the current fixed/pegged rate between the two currencies being broken, a financial institution would agree to exchange dirhams in the future for US dollars at the pegged rate. This hedging facility was provided by Morgan Stanley & Co. International plc and steps were taken to ensure that the facility met all the *Shari'ah* requirements.

Source: de Belder (2009). The authors are grateful to SNR Denton, formerly Denton Wilde Sapte, for sharing the case study. See: [http://www.snrdenon.com/pdf/Syndicated\\_and\\_Structured\\_IF\\_Chapter\\_3.pdf](http://www.snrdenon.com/pdf/Syndicated_and_Structured_IF_Chapter_3.pdf)

## **LESSONS FROM THE FINANCIAL CRISIS**

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The financial crisis that started in 2007 has highlighted several shortcomings concerning the role of financial engineering and financial innovation. These vulnerabilities were not evident during the boom and high growth period but became a significant factor as the crisis developed. There are a number of frictions and market imperfections that lower the effectiveness of financial innovation. These have become much more apparent during the current crisis as primary market issuance and secondary market trading of some innovative financial instruments fell sharply and led to a serious liquidity crisis.<sup>1</sup>

While financial innovations have made a significant contribution to economic development, it is worthwhile examining their negative aspects—their complexity, remoteness, liquidity issues, and lack of transparency—and the impact they have had on the financial crisis.

Some of undesirable and unwanted aspects of financial engineering include increased complexity, remoteness, liquidity issues, and lack of transparency, which are discussed further below.

### **Complexity**

Increased globalization and financial integration has given rise to highly interconnected markets which respond quickly—and sometimes unexpectedly—to external events. Financial products developed with payoffs linked to different asset classes and with exposure to multiple markets have led to complicated products requiring a delicate balance. With high customization to meet specific market views, financial innovation has created a new breed of exposure: exposure to complexity. Increased complexity has made it difficult for market players, on both demand and supply sides, to fully comprehend all payoffs and exposures in all possible states of the world and has led to greater complexity across the financial system. This complexity has made the task of regulators and supervisors that much more difficult.

### **Incomplete Information and Customization**

The vision of a world of complete and efficient markets for risk depends on having full information. This full-information requirement sounds deceptively simple but is actually extremely onerous. An investor needs to know the mapping between states of the world and the payoffs they would receive in each state as well as the likelihood of these states of the world materializing. It entails not only understanding the details of highly complex contracts but also the effects of the interplay between exposures and contracts of all the other agents in the economy. Not surprisingly, many of the problems that have occurred over the crisis have arisen out of incomplete and asymmetric information.

Because many financial products are so highly customized, it is often not easy to fully grasp their inherent risks. An over-reliance on quantitative

analysis in a make-believe world can lead the unwary into uncharted waters or give a false sense of security. Taleb (2007) highlighted the flaws in the general assumptions and statistical properties of payoffs very frequently used as a foundation of financial innovation or risk measures. With highly customized payoffs, incomplete information can indeed have an impact on the stability of financial systems.

### **Liquidity**

There is also an important and fundamental tension between the capability of financial engineering to tailor financial products to meet individual investor demand more effectively, and secondary market liquidity. The more closely a specific financial instrument is matched to the risk preferences of an individual investor, the harder it is to find another investor willing to trade that exact instrument in the event of a shock to those risk preferences.<sup>2</sup>

Early on in the current crisis, risk screening and the availability and quality of information on the performance of complex products were recognized as being significantly weaker than previously anticipated. This became obvious when, for example, investors lost confidence in the quality of credit ratings, which led to a substantial increase in the risk premium required to hold such assets. These effects made the valuation of assets extremely uncertain and contributed to the rapid evaporation of secondary market liquidity.<sup>3</sup>

While a financial product may not ring alarms during the normal course of events, it can suddenly be exposed to liquidity risk even with minor signs of a crisis. This can immediately lead to deteriorating asset value due to high liquidity premium and can offset the benefits of the financial instruments for portfolio or risk management.

### **Remoteness**

Securitization is often cited as one of the factors in the development of the financial crisis. A closer look, however, shows that the process of securitization itself was not to blame, but that the problem was the loss of information that was built into the process because of the separation between the originator of the loan and the end investor. In other words, the securitization process was carried with multiple layers of intermediaries and with multiple levels of competing and often conflicting interests, resulting in a gulf between the investor and the underlying asset. As a result of this remoteness, the system lost the trust of market participants very quickly and accelerated the crisis, even where the underlying asset was of good quality.

### **Operational Risk**

Customized and complex products require extensive documentation and monitoring, which requires sound risk-monitoring infrastructure. Some who invest in structured products may not have the wherewithal to monitor and mitigate the associated operational risks. Reporting risk is also associated

with structured products, which require fair-value computation and proper accounting treatment of gains and losses. In a fast-evolving market, an institution can very quickly become exposed to additional operational risk associated with new products, and as this exposure aggregates across multiple investors, it can threaten the stability of the financial system.

### **Transparency**

As opposed to engineering professions where there is extensive testing in real-life situations and a long history of professional experience in the fields of civil, mechanical, or structural engineering, financial engineers do not have the luxury of a control environment for performing thorough testing. Since a new financial product gives a potential competitive edge to its inventor, there is less incentive to share the information with others and therefore less transparency in the process of innovation. Investment banks guard their products strictly, which means that any new product is subjected to less scrutiny by outsiders.

## **CHALLENGES FOR FINANCIAL ENGINEERING IN ISLAMIC FINANCE**

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Developing new financial instruments is no easy task. The success of financial engineering in conventional markets was not achieved overnight, but was the result of many years of preparation and incremental progress. Conventional markets had another advantage—the availability of a highly liquid fixed-income securities market. A steady supply of short- and long-term securities with minimal cost of entry and exit helped the development of new products in an arbitrage-free market. Innovation and product development were further boosted by advances in technology, with more computing power enabling the analysts to build complex models to solve complex equations.

Islamic financial markets face several challenges in introducing the process of financial engineering. Some of these challenges are discussed below.

### **Theoretical Foundation**

One of the major stimulants to rapid innovation in conventional financial markets was the breakthrough in financial theory. The theories of capital structure, portfolio diversification and option pricing laid the foundation for more-sophisticated solutions to complex problems. Although some theoretical work has been undertaken in Islamic finance, there are many areas, such as asset pricing, risk pricing, derivatives, and so on, which need further research. Without solid theoretical work and without a full understanding of the risk/return profiles it becomes difficult to apply financial engineering.

An economist cannot solve all theoretical issues without understanding the principles of the *Shari'ah* or without working closely with a *Shari'ah*

scholar. Therefore, it is essential that serious research efforts be made collectively to address the theoretical foundation of the system upon which a more sophisticated set of instruments can be built. This requires that all stakeholders who are interested in the further growth of the industry—primarily banks and governments—allocate the necessary resources.

### **Investment in Infrastructure**

Financial engineering and the development of new products are resource-intensive activities. All major conventional banks have dedicated departments to conduct background market research, product development, and analytical modeling. These activities require significant investments of financial and human resources. Conventional financial institutions can justify this because they are able to recover costs, in most cases, from the volume of business generated by their innovative products. The costs associated with the development of new products are further increasing as a result of the growing complexity of a business environment in which stiffer regulatory, accounting and reporting standards make greater demands.

Islamic financial institutions are generally small and thus unable to reap the benefits of the economies of scale. Alone, they cannot afford to invest substantial funds in research and development. However, given the importance of the subject, they should give serious consideration to making joint efforts to develop the basic infrastructure for introducing new products. Although collaboration is almost counterintuitive in a field where innovation often leads to a competitive edge, conducting basic research and development collectively may save some of the costs required to build this infrastructure individually. They could, for example, sponsor research into developing analytical models, computer systems and tools to analyze the risk and return on different *Shari'ah*-compatible instruments.

### **Collaboration and Cooperation**

Financial engineering is an area where IFIs can benefit from the greater experience of their Western counterparts. Conventional investment banks, which have already made heavy investments in the infrastructure for developing new products, can work for, or with, Islamic institutions to develop products geared specifically to the IFIs' requirements. The IFIs may find it beneficial to outsource the development aspects to conventional institutions and keep the marketing of the new products for themselves.

### **Cross-training**

*Shari'ah* scholars play a critical role in approving new financial products. While they may be masters in *Shari'ah* matters, their knowledge of business practices, economics and finance may be limited. Today's financial institutions work in a complex business environment, which puts the onus upon the *Shari'ah* scholars to be more vigilant and sympathetic to the needs



of institutions and their customers. They need to assume an active role in understanding the nature of business and banking. Special training institutions can be set up to develop targeted training for *Shari'ah* scholars in areas outside their expertise, and for economists and bankers in matters pertaining to *Shari'ah* law. Such cross-training will help each party to understand the other's point of view.

### **Standardization**

The introduction of new products can benefit greatly from the standardization of contracts and unification of standards across markets. *Shari'ah* scholars can play a positive role in this regard. Regulators can help in defining accounting, reporting and supervisory standards, which can help reduce the costs involved in introducing new products to different markets.

### **Judicial use of "Law of Necessity"**

It is observed that *Shari'ah* scholars tend to invoke the law of necessity (*dharoora*) to accommodate pressing demands from bankers or customers. Extreme caution should be observed in making sure that a practice allowed under the law of necessity does not become a rule. Frequent use of such exceptions may not only contaminate the essence of the system, it may also raise suspicions in the minds of those who have put their trust in the system.

### **Check on *Shari'ah* Arbitrage**

In Islamic jurisprudence, the act of combining several contracts in a manner which creates an effect or behavior that is either prohibited or counterintuitive to the essence of Islam is called *hila* (artifice), and has been condemned throughout history. Such an act is the equivalent of regulatory arbitrage where an innovation is introduced to circumvent regulations. The industry and *Shari'ah* scholars will be watching closely to ensure that such acts are nullified.

A recent example of arbitrage is *tawarruq* (reverse *murabahab*) which creates a debt obligation by pretending a sale of a real asset which, in reality, does not change hands. This practice has been declared void by OIC *Shari'ah* scholars. Although it is still practiced in the market, its occurrence has declined considerably since the ruling in 2009.<sup>4</sup>

## **CONCLUSION**

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The scope of financial engineering and derivatives in Islamic finance will be determined by several factors. The most critical of these factors is how successfully the industry is able to adhere to the objectives of *Shari'ah*, which are the ultimate goal of each action.

Chapra (2008) compiles different views on these objectives and highlights those designed to promote the well-being of humans through

safeguarding their faith, self, intellect, posterity and wealth. He constructs a detailed system to demonstrate that each of these objectives provides the guidelines for economic development, social justice, good governance, and general human well-being irrespective of race, color, religion, and creed.

The development of financial engineering and derivatives will be governed by the objectives of *Shari'ah* and will, therefore, ensure that injustice in any form of inequity, exploitation, oppression and wrongdoing will not be acceptable.

The preservation of wealth and the protection of property rights will guide the innovation to promote the equitable distribution of income and wealth and to long-term sustainable economic development. The challenge for scholars will be to reinterpret the *Shari'ah* in the light of ever-changing social and economic circumstances but without sacrificing its core objectives.

The second critical factor is to create a balance between public good (*maslahah*) and the objectives of *Shari'ah*. With the increasing complexity and volatility of financial markets, it could be argued that there is a need for hedging to be permitted as a public good (keeping in mind the *Shari'ah* objective to protect wealth). Certain derivative products such as forwards, futures, swaps, and options provide protection against risks and, therefore, make a strong case of consideration under *maslahah*. The challenge would be how to approve a product which meets this need for public good without violating the core principles of Islam.

The third critical factor would be to focus on the essence rather than the form. Serious financial engineering should not permit any regulatory arbitrage (especially when it comes to *Shari'ah* arbitrage) and practices which are against the spirit of Islam and which do not promote genuine risk sharing in financial products and services. Innovation, rather than imitation or the reverse engineering of conventional products, should be given priority. The Islamic financial industry will have to develop products which discourage debt-like instruments and promote risk-sharing products.

The efficiency and benefits of a product should not be determined by the complexity of its payoffs or of the formulas to assess its value. Rather, they should be determined by transparency in design, clarity in payoffs, and closeness of ownership to the underlying asset. There should be a focus on simpler, more standardized, and more liquid products, which are less prone to unexpected changes in their likely performance and, therefore, are able to sustain liquidity during periods of stress.

Finally, although financial engineering should be encouraged in Islamic finance, its growth should be closely monitored to achieve the ultimate goals of *Shari'ah*. Further research is required on the permissibility of derivatives.

Alternative ways to mitigate and transfer risks—such as cooperative mechanisms, collective funds or solidarity funds—should be developed to contribute to the stability of the financial system.

Examples demonstrating the application of financial engineering techniques in the area of risk management and benchmarking can be found in Appendix C.

## APPENDIX C

# Potential Applications of Financial Engineering

Following are a few examples demonstrating the application of financial-engineering techniques in the area of risk management and benchmarking. These examples use the basic instruments to develop new instruments that are currently not available in the market. It should be noted that the instruments discussed here are only examples and they should be taken with the qualification that the final approval and application rests with the *Shari'ah* experts.

### **SYNTHETIC CURRENCY FORWARD CONTRACT**

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The concept of arbitrage pricing and the ability to replicate a security synthetically has played a critical role in the development of derivatives and risk-management tools in conventional finance. Arbitrage is used extensively to demonstrate that in an efficient market two instruments with identical risk/return characteristics cannot have different prices. The ability to construct and to replicate a security or portfolio synthetically helped in the development of derivative products, as it was demonstrated that two portfolios—one with a derivative security and the other with plain vanilla securities—would have identical risk/return profiles in a world free of arbitrage. Such arbitrage principles and the techniques of financial engineering can be applied, using the basic building blocks of the Islamic financial system, for devising derivative instruments that are not currently practiced.

A currency forward contract is an agreement to buy or sell a foreign currency at a predetermined price at a predetermined future date. Islamic instruments permit similar forward contracts (future delivery at a pre-agreed price) but only in the case of commodities, provided certain conditions stated by the *Shari'ah* are followed. The Islamic forward contract, *bay' al-salam*, permits one party to purchase a commodity at a predetermined price for a future delivery and the purchaser is required to make full payment at

the time of contract. However, application of *bay' al-salam* to foreign currency is not permitted simply because Islam treats currency as a medium of exchange and not as a commodity. There are no other instruments that can be used to hedge against the volatility of the exchange rate.

The following section demonstrates how a currency forward contract may be constructed synthetically without a standard forward contract. The synthetic construction of a forward contract means that the payoffs are identical to a forward contract, but they are achieved through a set of different transactions executed in a certain sequence. These products can make significant contributions to risk management in Islamic financial markets, providing hedging against currency risk.

Take as an example an importer in an Islamic country who wants to hedge against the volatility of a foreign currency. In the absence of a currency forward contract, the importer will be exposed to risk arising from any appreciation in the value of the foreign currency. Assuming that there are no market frictions such as taxes, capital controls and transaction costs and that there are financial intermediaries who have access to both local and foreign money markets, a forward contract can be constructed synthetically using the *murabahah* contract, which results in a financial claim from the sale of a real asset. However, since the margin above cost (mark-up) is agreed upon in advance, the expected rate of return is pre-determined. The financial claim created in this fashion is similar to a zero-coupon fixed-income security or a certificate of deposit (CD) in conventional banking.

Suppose that the importer wants to hedge  $X$  amount of foreign currency obligation for a period of time ( $T$ ) from today ( $T_0$ ). Current market rates of return on a three-month *murabahah* contract in domestic and foreign markets are  $R_d$  and  $R_f$  respectively. The importer can approach a financial intermediary or Islamic bank to arrange for the purchase of  $X$  amount of foreign currency in the future.

The following steps can be taken by the financial intermediary to provide a currency hedge to the importer by taking positions in assets in foreign markets in collaboration with a local investor:

**On the date of the contract ( $T_0$ ):**

**Step 1:** Importer requests the bank to arrange for a currency forward contract for maturity  $T$ . The banker enters into a *jo'alah* contract with the importer to deliver  $X$  amount of foreign currency at the foreign exchange rate at time  $T$ . This contract allows the importer to hire the bank to provide a service; that is, to arrange or deliver currency at time  $T$  for a pre-determined fee.

**Step 2:** The banker finds an investor in the domestic market who is willing to participate in arranging a currency forward contract for maturity  $T$ . Or, the bank may use funds from an existing depositor's investment account as well. Let us assume that the expected rate of return in the local market at time  $T_0$  was  $R_d$ .

**Step 3:** The bank determines the amount in the foreign currency required today (at  $T_0$ ) to hedge  $X$  amount of foreign currency at time  $T$ . In other words, what is the present value of  $X$  amount of foreign currency given the expected rate of return? That should be equal to the value of a *murabahah* in foreign currency at time  $T_0$ , so that the cost plus the profit margin in the foreign market is equal to the required hedge amount of  $X$  in foreign currency at time  $T$ . Therefore, the amount required today to hedge  $X$  amount of foreign currency would be equal to  $x$  in foreign currency as shown below:

$$x = \frac{X}{(1 + R_f)}$$

**Step 4:** Local currency ( $L$ ) required at time  $T_0$  will be equal to  $x \times$  spot exchange rate between the local and the foreign currency. The bank invests  $L$  amount of local currency in foreign *murabahah* after converting  $L$  amount of local currency into  $x$  amount of foreign currency at the spot rate at  $T_0$ .

**Step 5:** The bank agrees with the importer to deliver  $X$  amount of foreign currency on maturity date  $T$  at rate  $F$ . The bank determines the rate  $F$  based on the rate-of-return differential between the domestic and foreign markets. In other words, the future rate  $F$  is a function of the expected rates of return on local and foreign *murabahah* for time  $T$ . The difference between domestic and foreign *murabahah* mark-up rates determine the discount/premium on forward rate. This rate  $F$  can also be called the unbiased predictor of the future spot rate, because if this rate is not the equilibrium rate, there is opportunity for arbitrage where the arbitrageur can make risk-less profit by taking offsetting positions in the market creating the arbitrage. In other words, the forward exchange rate ( $F$ ) will be determined in such a way that the forward discount/premium on the currency is equal to the differential of expected rates of return on *murabahah* contracts of equal risk in domestic and foreign capital markets. This rate ( $F$ ) is not only the best estimate of the future spot exchange rate, but is also an arbitrage-free forward rate for the currency.

**At the date of delivery ( $T$ ):**

**Step 6:** The bank receives  $X$  amount of foreign currency against the *murabahah* investment. The importer buys  $X$  amount of foreign currency by paying  $X \times F$  amount of local currency to the bank. Since the bank initially invested  $L$  amount, the rate of return to the bank or the investor would be equal to  $R_d$ , or the same as the bank or the investor would have earned by investing in local *murabahah*.

This synthetic forward contract is fully backed by an Islamic investment in the form of a *murabahah*. As a result, the bank or the investor earns  $R_d$  on the investment. The importer benefits from the exchange rate hedge in case the future exchange rate moves unfavorably.

The following illustrates the calculations involved in a synthetic forward contract and the profit made by the bank or the investor in our example:

Local currency:	Euro (€)
Foreign Currency:	US Dollar (\$)
Period:	3 months
Rate of Return on 3-month <i>murabahah</i> in domestic market (R€):	10%
Rate of Return on 3-month <i>murabahah</i> in foreign market (R\$):	5%
Spot Rate:	€0.85/\$
Amount to hedge:	€1,000,000.00

Amount of investment required in foreign currency at settlement date ( $T_0$ ):

$$\frac{\text{Hedge Amount}}{(1 + R_s)} = \frac{1,000,000}{(1.05)} = \$952,381$$

Amount of investment required in local currency at settlement date ( $T_0$ ):

$$\text{Foreign Amount} \times \text{Spot Rate} = \$952,381 \times 0.85 = \text{€}809,524$$

Convert €809,524 @ €0.85/\$ to \$952,381 and invest the proceeds in \$ *murabahah* with expected rate of return = 5 percent.

Arbitrage-free forward rate (F) quoted to importer:

$$F = \text{Spot} \times \frac{(1 + R_{\text{Euro}})}{(1 + R_{\$})} = 0.85 \times \frac{1.1}{1.05} = 0.8905 / \$$$

Value of *murabahah* at maturity (T):

$$\text{Investment amount} \times (1 + \text{Rate of Return}) = \$952,381 \times (1.05) = \$1,000,000$$

The bank received \$1,000,000 from foreign *murabahah* investment and sold \$1,000,000 to the importer at €0.8905/\$ and received €890,500.00.

The bank or investor's rate of return:

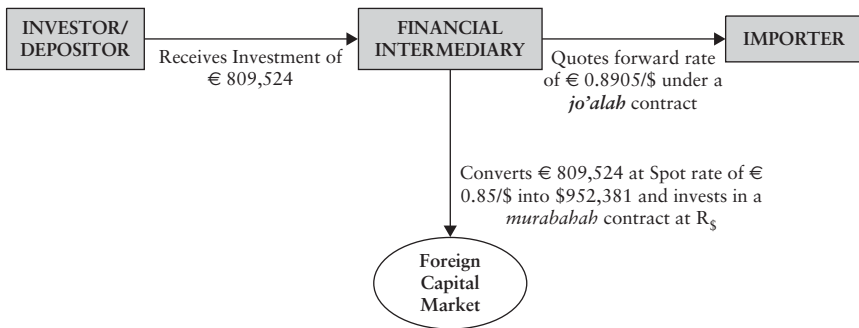
$$\frac{\text{Amount at Maturity}}{\text{Initial Investment}} - 1 = \frac{890,500}{809,524} - 1 = 10\%$$

The importer is able to hedge his/her currency risk and the bank/investor has earned a 10 percent return, which is also equal to the rate of return on domestic *murabahah*, indicating the bank/investor's opportunity cost.

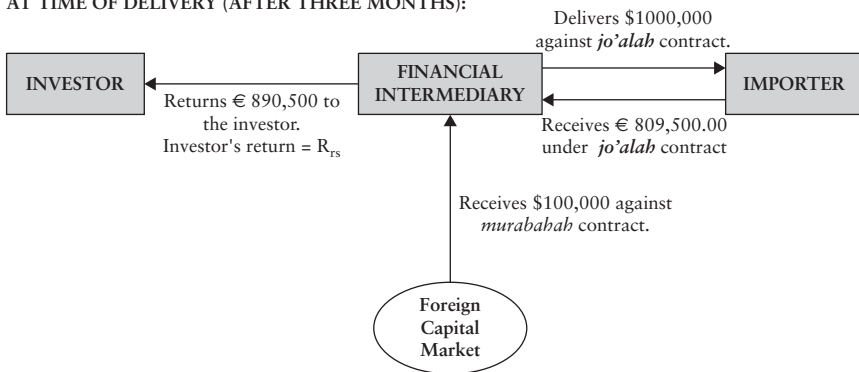
The above example is a simple demonstration of the construction of a synthetic currency forward contract. In a capital market where there are large numbers of users and providers of capital, a financial intermediary can serve the purpose of matching the needs of both entrepreneurs and investors. The financial intermediary that has wider access to several money and capital markets can perform the function more efficiently by standardizing the products, enhancing credit through underwriting (*kifala*) and offering clients risk management services for a reasonable fee (in the form of *jo'alah*).

Figure AC1 illustrates the construction of the synthetic forward contract in our example.

AT TIME OF CONTRACT ( $T_0$ ):



AT TIME OF DELIVERY (AFTER THREE MONTHS):



**FIGURE AC1** Construction of a synthetic forward contract

**Note:** Illustration does not take into account any transaction cost or financial intermediary's fees.

## CURRENCY SWAP

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Currency swaps are one of the most popular applications of financial engineering and the market for them has grown exponentially since their introduction in the early 1980s. The underlying concept is to exploit a comparative advantage in a particular market to raise capital at favorable rates and then agreeing with another party to exchange cash flows according to a predetermined schedule for cash flows in another currency. As an off-balance-sheet instrument, a currency swap is frequently used to hedge against currency risks, to lower funding costs through arbitrage in different capital markets, and to gain access to otherwise inaccessible emerging markets.

A currency swap can help an institution reduce its exposure to a particular currency by allowing it to swap existing assets or liabilities for more desirable ones. For example, an Islamic financial institution may develop a comparative advantage in the market for assets or liabilities in a particular currency and this advantage can lead to increased exposure in a particular currency. Currency swaps enable financial institutions to manage currency exposure and also achieve better asset/liability management, which can ultimately reduce the overall financial risk.

Since a currency swap is an agreement to exchange cash flows in accordance with a fixed schedule, it can also be viewed as a series of currency forward contracts for each period of the schedule. Currency swaps are currently not practiced in Islamic financial markets, mainly because of the prohibition on currency trading in the forward markets. However, there are other ways of going about it. Currency swaps were a by-product of a practice known as “parallel loans,” which was followed by several corporations to avoid regulatory constraints. With this practice, both a parent company and its foreign subsidiary borrow in their respective markets (foreign and local currencies) and then swap the proceeds internally between them. In this way, a currency swap can be viewed as an exchange of two bonds (loans) in different currencies.

The following sections describe two different ways to construct a currency swap that may be acceptable in the Islamic financial market. The first method involves a partnership with a financial intermediary, and the second is based on the exchange of *sukuk* proceeds.

### Partnership-based Currency Swap

Suppose that an IFI has accumulated a portfolio of *ijarah* assets in a currency that is different from the currency of its liabilities (funding side). In order to reduce its exposure to a single currency on its assets side, the IFI wants to swap a portion of its portfolio into the currency of its liabilities in order to improve its asset/liability management. For the sake of simplicity, the example is reduced to a single *ijarah* asset, but the principle can be extended to a pool of assets through securitization.



A financial intermediary can arrange such currency swaps through the following steps:

**Step 1:** The financial intermediary and the financial institution (A) agree to enter into a partnership where the financial intermediary will buy that portion of the portfolio which the financial institution would like to swap: in our case, the *ijarah*-based asset denominated in Japanese yen (¥).

**Step 2:** The financial intermediary agrees to pay for the assets through equity participation certificates issued by the financial intermediary in a foreign currency; that is, US dollars (\$).

**Step 3:** In order to be fully hedged, the intermediary enters into an identical agreement with another financial institution (B), which is holding an *ijarah* asset in the foreign currency (\$) and desires to swap its assets to ¥. (A) and (B) exchange the principal amounts in the respective currencies equal to the respective asset values at the time of the settlement.

**Step 4:** All future cash flows of party (A) in ¥ will be passed on to the financial intermediary as part of the partnership agreement.

**Step 5:** All future cash flows of party (B) in \$ will be passed on to the financial intermediary as part of the partnership agreement.

**Step 6:** At each future cash flow date, the financial intermediary will pass the ¥ cash flows which it received from party (A) to party (B), and all \$ cash flows which it received from party (B) to party (A). This will effectively convert each party's assets from one currency to the other. At maturity, the principal amounts equal to asset values will be exchanged back in the original currencies. The intermediary earns fee income for arranging and servicing this agreement.

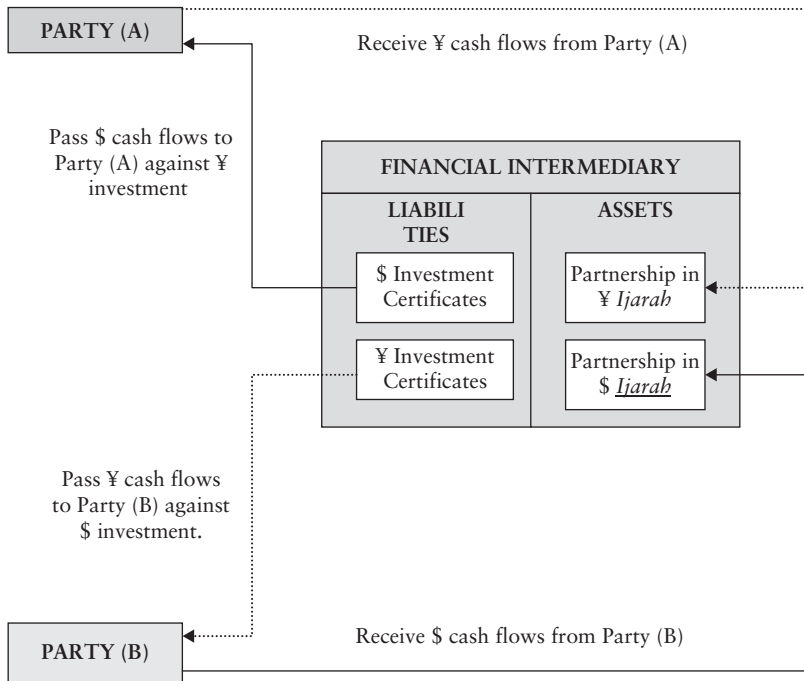
Figure AC2 illustrates the flows and the role played by the financial intermediary.

The main difference between this and a conventional currency swap is that the financial intermediary becomes a partner in the assets of each financial institution and the cash flows are fully backed by the cash flows on each underlying asset. Where in a conventional currency swap, the financial intermediary underwrites the credit risk only, in the Islamic version, the financial intermediary backs each agreement with a real asset in addition to underwriting the credit risk.

This, of course, is a simplified version for illustrative purposes and finding assets of the same maturity and equivalent value is not easy. One way to reduce this problem would be to collect a pool of assets of similar maturity and to securitize the assets through *sukuk*, which can be swapped as one security. This idea is further refined in the second method.

### **Sukuk-based Currency Swap**

As mentioned earlier, a currency swap can be viewed as two parallel streams of cash flows from two bonds in two different currencies which the parties agree to swap. Since Islamic bonds, *sukuk*, are similar to conventional



**FIGURE AC2** The role of the intermediary in a partnership-based currency swap

bonds in their payoffs, a currency swap can be constructed by utilizing the *sukuk* structure.

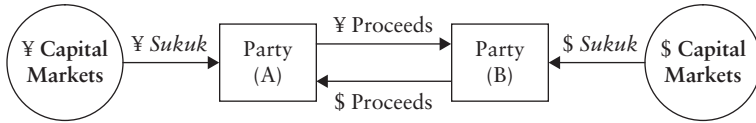
For example, suppose party (A) is well-established and well-known in ¥ capital markets and is thus able to raise funds through *sukuk* in ¥ at attractive rates. However, its funding objectives are to borrow in \$ to match its liabilities but its cost of funding in \$ is higher. At the same time, party (B) is able to raise funds through *sukuk* in the \$ market at attractive rates because of its established track record and credit standing, but its funding objectives are to borrow in ¥. Following the theory of comparative advantage, both parties issue *sukuk* in the respective markets in which they have the comparative advantage and then agree to swap cash flows to achieve their respective funding objectives.

The following steps can be taken to create a currency swap using *ijarah*-based *sukuk*:

**At the time of settlement ( $T_0$ ):**

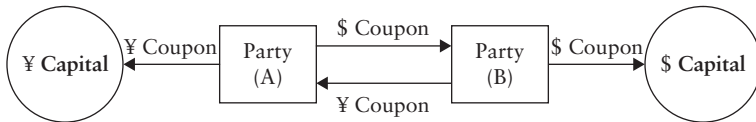
**Step 1:** Party (A) issues *ijarah sukuk* in ¥, and party (B) issues an *ijarah sukuk* in \$. The *ijarah sukuk* are selected in this case, rather than ones that are *salam*-based, because they allow the possibility of trading in the secondary markets.

**Step 2:** With the help of a financial intermediary, both parties agree to enter into a currency swap where (A) promises to take (B)'s liability in \$, and (B) promises to take (A)'s liability in ¥. At the time of settlement, both parties exchange the proceeds from the *sukuk* each received from the market.



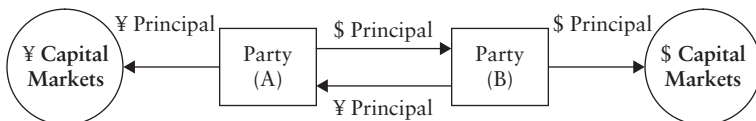
**At each *sukuk* coupon payment:**

**Step 3:** At each coupon period, (A) pays \$ coupons on (B)'s *sukuk* and receives ¥ cash flows from (B), which are used to pay to the *sukuk* investors. Similarly, (B) pays ¥ to (A) in exchange for \$ coupons which are passed on to the *sukuk* investors.



**At maturity (T):**

**Step 4:** The principal amounts of the *sukuk* in the respective currencies are exchanged. Party (A) receives ¥ principal from (B), which is used to pay off the ¥ *sukuk* issued by (B). Similarly, (B) receives \$ principal from (A), which it used to pay back the \$ *sukuk*.



**RATE-OF-RETURN SWAP**

The interest-rate swap market is the largest over-the-counter (OTC) derivative market, which indicates the importance and prevalence of this instrument. The idea behind an interest rate swap is to exchange cash flows in the same currency according to a predetermined schedule. The main purposes of entering into such an agreement are to lower the cost of funding, to enhance yield, or to manage the interest rate risk. The most common type is a fixed-to-floating rate swap, where one party agrees to swap fixed-rate coupon payments against receipt of floating-rate coupon payments for a predetermined notional amount.

The concept described above to develop currency swaps using *sukuk* can be applied to developing an Islamic instrument similar to the rate-of-return swap, with the main difference being that parties will agree to

exchange the rate of return on one asset with another, rather than exchanging interest rates. Rate-of-return swaps are different from currency swaps in that there is no exchange of principal, since the cash flows belong to the same currency. Note that *ijarah*-based *sukuk* are suitable for constructing a rate-of-return swap because they are available in both fixed- and floating-return formats.

This rate-of-return swap can be constructed as follows:

**Step 1:** Party (A) has a comparative advantage in raising funds through fixed-rate *sukuk*, but would like to convert this liability into a floating-rate liability to match its assets. Similarly, (B) has a comparative advantage in raising funds through floating-rate *sukuk*, but would prefer to have a fixed-rate liability to match its assets.

**Step 2:** (A) decides to issue fixed-rate *sukuk* and (B) issues floating-rate *sukuk*. Both parties enter into an agreement to exchange cash flows on the coupon dates. This could be an agreement to assume the other party's liability. Since both *sukuk* have the same amount of proceeds in the same currency, there is no exchange of principal cash flows.

**Step 3:** On each coupon period, (A) pays floating-rate payments to (B) against receipt of fixed-rate coupons, which are ultimately passed on to pay the *sukuk* holders. For (A), the net effect is a floating-rate liability. Similarly, (B) pays fixed coupons against receipt of floating coupons from (A), which are passed on to the holders of the floating-rate *sukuk*.

**Step 4:** At maturity, no principal exchange takes place. Both parties make payments to their respective *sukuk* holders.

The following example illustrates cost saving through an interest rate swap.

Costs before Swap	Party (A)	Party (B)
Fixed-rate <i>sukuk</i> :	5%	5.5%
Floating-rate <i>sukuk</i> :	[Islamic Index] +25 bps	[Islamic Index] -25 bps

Based on the comparative advantage, (A) decides to issue fixed-rate *sukuk* at 5 percent and (B) decides to issue floating-rate *sukuk* at [Islamic Index] -25 bps.

Costs After Swap	Party (A)	Party (B)
Receives from counterparty	5.0%	[Islamic Index] -25 bps
Pay to counterparty	[Islamic Index] - 25 bps	5.0%
Pay to <i>sukuk</i> holders	5%	[Islamic Index] -25 bps
Net Funding Cost	[Islamic Index] -25 bps	5%
Net Savings (difference in before and after cost)	50 basis points	50 basis points

In this example, both parties agree to exchange cash flows to match their obligations to the *sukuk* holders. However, in reality, the party with the better credit quality tends to charge the other party an additional cost to reduce its own overall cost. Since the charging of an additional cost to assume the other party's liability may raise *Shari'ah* objections, no additional cost in the swap is incorporated. We leave this issue to be discussed by *Shari'ah* scholars.

## **DEVELOPMENT OF AN ISLAMIC BENCHMARK**

The availability of an efficient, frequently quoted and globally accessible reference rate for pricing assets and a benchmark for evaluating portfolio performance is vital to the success of today's financial markets. Islamic financial markets are no exception to this and their growth and development are similarly dependent on an efficient and stable benchmark. While Islamic financial markets have made considerable progress in the last few decades, the issue of benchmarks has received little attention to date. In the absence of a suitable equity-based benchmark compatible with the principles of the Islamic financial system, markets have often resorted to the use of interest-based benchmarks such as LIBOR to determine mark-up rates in trade finance, to price assets and to evaluate portfolio performance.

A model developed by Haque and Mirakhor (1997) addressed the design of an equity-based index, which fully conforms to Islamic principles and can ultimately serve as a benchmark for issuing government paper.<sup>5</sup> Their approach is based on a simple argument; namely, that government paper collateralized against its development and infrastructure projects which do qualify for equity-participation should not carry a return which is anyway less than the private-sector projects of similar risk. Therefore, given an efficient index to measure the return on private-sector security, governments can issue paper such as the National Participation Paper (NPP) to finance their development projects. The return on such an index needs to be adjusted for a risk premium, which would be negative for the government paper because governments are assumed to be insulated from credit and default risks.

The model argues that the principles of Islam dictate that the return on the financial sector in the economy should be determined by the return on the real sector of the economy. The return on the real sector could be derived from the expected growth of the dominant private-sector productivity as it is the main contributor to a country's nominal GDP. A desirable index needs to be efficient in terms of its ability to eliminate any arbitrage opportunity, to discourage speculative behavior and to be allocationally and operationally efficient. However, the fact that financial markets in the developing Islamic countries are not yet fully developed means that an index based on a single indicator may not prove to be efficient. However, a weighted index of different indicators representing activity in domestic, international, private and public sectors can be more robust, efficient and stable.

**TABLE AC1** Islamic index representing equity returns

$I = w_1WI + w_2LSI + w_3PPI + w_4ROG$
<p>where</p> <p>I = Index representing rate of return on the private sector</p> <p>w1, w2, w3 and w4 are weights for each indicator. Weights to be determined by each market to match individual market characteristics.</p> <p>WI = An international stock market index such as the MSCI emerging-market index.</p> <p>LSI = Domestic market performance index, e.g. stock market index, average <math>q</math> for the economy, return on equity (ROE), etc.</p> <p>PPI = A weighted average of returns in commercial participation paper market as it develops.</p> <p>ROG = Measure of the rate of return on government investments in developmental and infrastructure projects against which government paper is issued.</p>

Table AC1 gives a summary of how a weighted composite index, which represents equity returns in an Islamic economy, can be constructed. The inclusion of a local stock-market index is natural, but not without certain reservations. Depending on the degree of that market's depth, breadth and liquidity determining the competition and efficiency of the market, the domestic stock market index may or may not be included. In the case of a shallow market, other factors influencing investment decisions, such as the economy's  $q$  ratio, price/earnings (PE) ratio and dividend yield or return on equity (ROE), can be included.

Basing the index on the domestic stock market or local indicators alone is not recommended because of the lower degree of development of domestic equity markets in Islamic countries. In order to broaden the index, it is advisable to include an external index representative of the regional or international financial environment. Given recent economic liberalization, globalization and integration of the international capital markets, it is reasonable to assume that the domestic rate of return will reflect the returns worldwide. It is desirable that the selected external index is easily monitored, relatively stable and broadly in line with the domestic economy.

## ENDNOTES

1. Jenkinson, Penalver and Vause (2009) identify five areas of potential weakness during the crisis: incomplete information; alignment of incentives; liquidity in financial markets; robustness of market infrastructure; and system dynamics. There may be insufficient information to gauge the risk in new financial instruments. Indeed, information can get lost when a chain of parties is involved in the creation of new financial instruments. If these parties do not retain an economic

interest in the performance of the instrument, its inherent risk can grow as incentives to screen and monitor weaken. In addition, the benefits of tailoring the risk profile to meet the demands of specific investors can be offset by the poor liquidity that might apply to a bespoke component.

2. Ibid.
3. Ibid.
4. OIC Resolution 179 (19/5/2009).
5. Haque and Mirakhor (1997).

## CHAPTER 13

# Risk Management

**A**s the banking business has changed significantly in the last two decades, the nature of the risks faced by financial institutions has also changed. Where three decades ago these were primarily credit and market risks only, today's financial institution is exposed to a whole array of new risks and this list is expanding. Several factors are responsible for this changed scenario:

- **Increased market volatility:** Financial institutions first realized the importance of risk management after the breakdown of the Bretton Woods system of fixed exchange rates, which led to significant volatility in the foreign exchange and interest-rate markets. Since then, volatility in the markets and the subsequent demand for risk management products has become a permanent feature of the markets.
- **Financial innovations:** Financial innovations and rapid developments in the derivatives market have increased the complexity of managing financial institutions. Innovative products have appeared on both sides of the balance sheet and each new product brings its own unique risk/return profile, which ultimately affects the risk profile of the institution. The risk/return characteristics of some of the new instruments are complex and are subject to highly volatile markets, exposing banks to new or higher degrees of risk.
- **Shift in banking business:** There has been a permanent shift away from traditional lending business towards fee-earning activities. The expanded role of money and capital markets has changed the nature of intermediation by moving it away from formal institutions to direct access to the market. The emergence of institutional investors such as mutual funds has taken a significant share of the market from traditional banking business.
- **Increased competition:** Competition has increased, making it difficult for small banks to compete as a result of the increasing costs of doing business and the high costs associated with managing risks. A wave of consolidation of financial institutions was witnessed in industrial countries in the late 1990s, making the need for risk management even more critical.



- **Regulatory environment:** In the wake of a series of financial crises, from the Third World debt crisis of the 1980s to the East Asian crisis of the 1990s, there has been greater awareness of the need for coordinated regulation and supervision of financial institutions, with a special focus on risk measurement and management and prudential capital requirements. There is a greater emphasis on coordinated efforts at the global level to harmonize standards, promote transparency in the system and to combat money-laundering and the financing of terrorism.

These developments have increased the need for risk measurement, management and controls. A comprehensive framework of risk management is applicable to conventional and Islamic banks alike. Research and experience in the past two decades have resulted in a much deeper understanding of the issues relating to risk management and, consequently, well-established principles of risk management have emerged. The process of risk management is a two-step process. The first step is to identify the source of the risk; that is, to identify the leading variables causing the risk. The second step is to devise methods to quantify the risk using mathematical models, in order to understand the risk profile of the instrument. Once a general framework of risk identification and management is developed, the techniques can be applied to different situations, products, instruments and institutions.

The absence of a developed risk management framework in Islamic finance has a significant impact on the current and future growth of the market because:

- A *Shari'ah*-compliant firm will lose its business competitiveness because of its inability to handle variability in its costs, revenues, and profitability through active hedging of financial risk.
- A firm without active risk management will be perceived as a high-risk firm and thus will be subject to higher funding costs and to a higher expected rate of return.
- There will be fewer optimal investment and diversification opportunities.
- The firm will be subject to a high risk of financial distress, especially during a system-wide crisis.

All of these factors will lead to increased riskiness for the investors and their wealth.

Having a robust risk management framework can also help Islamic banks reduce their exposure to risks, and enhance their ability to compete in the market. A reduction in each institution's exposure will reduce the overall systemic risk. Therefore, it is necessary that IFIs have a comprehensive risk management and reporting process to identify, measure, monitor, manage, report and control different categories of risks. This process should also pay special attention to compliance with *Shari'ah* rules and principles.

**TABLE 13.1** Banking risk exposures

Financial risks	Operational risks	Business risks	Event risks
Balance sheet structure	Internal fraud	Macro policy	Political
Income statement structure & profitability	External fraud	Financial infrastructure	Contagion
Capital adequacy	Employment practices and workplace safety	Legal infrastructure	Banking crisis
Credit	Clients, products and business services	Legal liability	Other exogenous
Liquidity	Damage to physical assets	Regulatory compliance	
Market	Business disruption and system failures (technology risk)	Reputational & fiduciary	
Interest rate	Execution, delivery and process management	Country risk	
Currency			

Source: van Greuning (2008)

Banks are subjected to a wide array of risks in the course of their operations, as illustrated by Table 13.1. In general, banking risks fall into four categories: financial, operational, business, and event risks. Any of these risk categories can be further divided into sub-categories.

Financial risks are subject to complex interdependencies that may significantly increase a bank's overall risk profile. For example, a bank engaged in foreign currency business is normally exposed to currency risk, but will also be exposed to risks such as liquidity, credit, and re-pricing if it carries open positions or mismatches in its forward book. Operational risks are related to a bank's overall organization and the functioning of its internal systems, including computer-related and other technologies; compliance with bank policies and procedures; and measures against mismanagement and fraud. Business risks are associated with its business environment, including macro-economic and policy concerns, legal and regulatory factors, and the overall financial sector infrastructure such as payment systems and auditing professions. Event risks include all types of exogenous risks, which, if they were to materialize, could jeopardize the bank's operations or undermine its financial conditions and capital adequacy.

**TABLE 13.2** Theoretical balance sheet of an Islamic bank based on maturity profile and functionality

Panel A. Based on maturity profile	
Assets	Liabilities
Short-term trade finance (cash, <i>murabahah</i> , <i>salam</i> )	Demand deposits ( <i>amanah</i> )
Medium-term investments ( <i>ijarah</i> , <i>istisna'</i> )	Investment accounts ( <i>mudarabah</i> )
Long-term partnerships ( <i>musharakah</i> )	Special investment accounts ( <i>mudarabah</i> , <i>musharakah</i> )
Fee-based services ( <i>jo'alah</i> , <i>kifala</i> , and so forth)	Reserves
Non-banking assets (property)	Equity capital
Panel B. Based on functionality	
Assets	Liabilities
Cash balances	Demand deposits ( <i>amanah</i> )
Financing assets ( <i>murabahah</i> , <i>salam</i> , <i>ijarah</i> , <i>istisna'</i> )	Investment accounts ( <i>mudarabah</i> )
Investment assets ( <i>mudarabah</i> , <i>musharakah</i> )	Special investment accounts ( <i>mudarabah</i> , <i>musharakah</i> )
Fee-based services ( <i>jo'alah</i> , <i>kifala</i> , and so forth)	Reserves
Non-banking assets (property)	Equity capital

Source: van Greuning and Iqbal (2008)

An IFI is also subject to all of these risks to varying degrees. Its operational, business, and event risks will be similar to those of its conventional counterparts and, therefore, do not require any special treatment and discussion here. However, the nature of its financial risk would be different and it is, therefore, important to understand the key differences in the risk profiles of intermediaries in the respective systems.

Table 13.2 presents a stylized balance sheet of an Islamic bank, displaying different activities and financial instruments. It serves as a good starting point for understanding the dynamics of the risks inherent in Islamic banks. Panel A classifies assets and liabilities based on the maturity profile of different instruments. Panel B provides an alternative view based on the functionality and purpose of different instruments. Some instruments, such as *ijarah* and *istisna'*, can be used across different maturity groups. Although several Islamic banks organize their financial statements on the basis of functionality, a maturity-based view of the balance sheet is important as it helps to understand exposure at the institutional level.

Realizing the significance of risk management, in December 2005 the Islamic Financial Services Board (IFSB) issued a comprehensive standards

document on risk management, identifying the different risks and listing 15 guiding principles of risk management for institutions offering Islamic financial services.

Figure 13.1 presents an overview of the risk profile for operating an IFI. Risks are grouped into four broad categories: financial, business, treasury, and governance risks. While these categories are also applicable to conventional finance, there are risks specific to Islamic banks and financial institutions arising from the different nature of the intermediation, products and constitution of the balance sheet. The major risks are discussed below.

## FINANCIAL RISKS

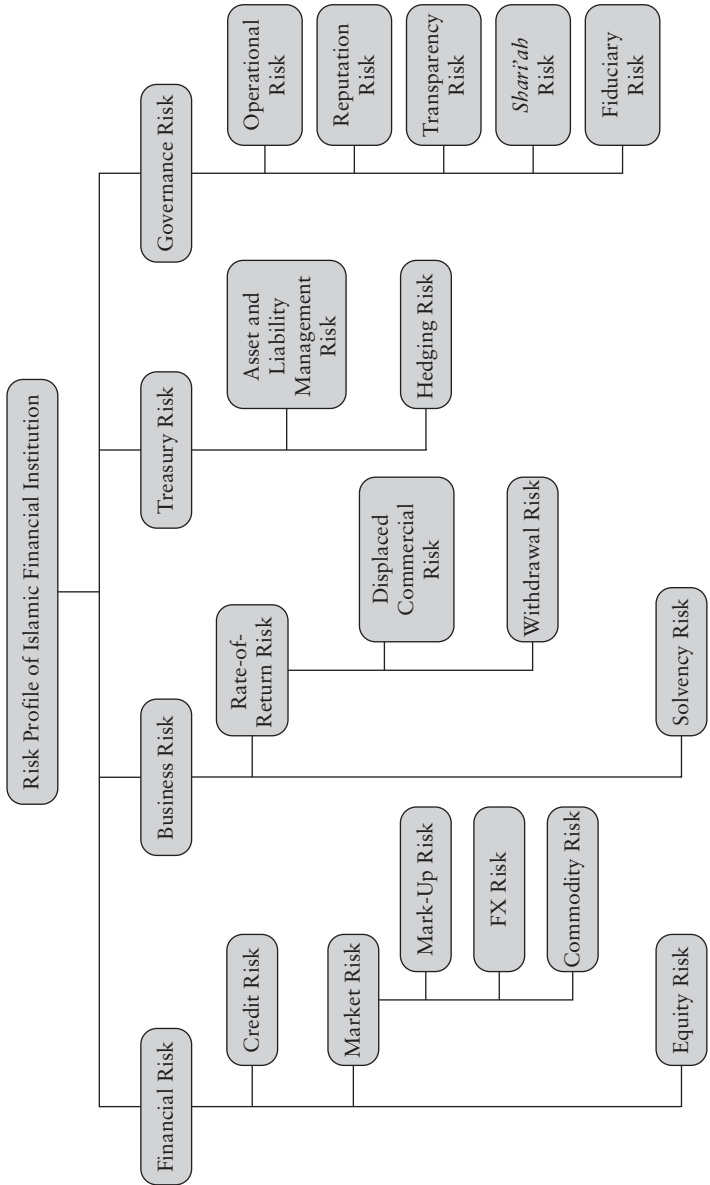
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Financial risks are the exposures that result in a direct financial loss to the assets or the liabilities of a bank. In the evolution of the risk management discipline, financial risks were the first to appear in the discussion and policy making. Both conventional and Islamic financial institutions are exposed to credit and market risks, but Islamic financial institutions are also exposed to equity investment risk.

### Credit Risk

Credit risk is the potential risk that a counterparty will fail to make payments on its obligations in accordance with the agreed terms. It also includes the risk arising in the settlement and clearing of the transactions. Credit risk is present to varying degrees in almost all of the instruments and there are many techniques to mitigate such risk. Traditional banking business based on lending operations is considered a credit-risk business since the bank's ability to minimize credit risk is the source of its profitability. In the case of IFIs, where lending is replaced with investments and partnerships, the importance of credit-risk management becomes more critical. The unique characteristics of the financial instruments practiced by Islamic banks have special credit risks such as the following:

- In the case of *murabahah* transactions, Islamic banks are exposed to credit risks when the bank delivers the asset to the client but does not receive payment from the client in time. In the case of a non-binding *murabahah*, where the client has a right to refuse the delivery of the product purchased by the bank, the bank is further exposed to price and market risks.
- In *bay' al-salam* or *istisna'* contracts, the bank is exposed to the risk of failure to supply on time or to supply at all, or failure to supply the quality of goods as contractually specified. Such failure could result in a delay or default in payment, or in delivery of the product, and can expose Islamic banks to financial losses of income as well as capital.
- In the case of *mudarabah* investments, where the Islamic bank enters into the contract as *rabb-ul-mal* (principal) with an external *mudarib* (agent),



**FIGURE 13.1** Overview of risk profile of an IFI

in addition to the typical principal/agent problems, the Islamic bank is exposed to an enhanced credit risk on the amounts advanced to the *mudarib*. The nature of the contract is such that it does not give the bank appropriate rights to monitor the *mudarib* or to participate in the management of the project, which makes assessment and management of the credit risk difficult. The bank is not in a position to know and decide how the activities of the *mudarib* can be monitored accurately, especially if claims of losses are made. This risk is especially present in markets where information asymmetry is high and there is low transparency in financial disclosure by the *mudarib*.

Managing credit risk is further complicated by some additional externalities. In the case of default by the counterparty, Islamic banks are prohibited from charging any accrued interest or imposing any penalty, except in the case of deliberate procrastination. This can be misused by clients who may delay the payment, since they know that the bank will not impose extra charges. During the delay, the bank's capital is not productive and its investors/depositors are not earning any income. Another example is where the bank's share in the capital invested through a *mudarabah* or *musharakah* contract is transformed into a debt obligation in the case of proven negligence or misconduct of the *mudarib* or the *musharakah*'s managing partner. As a result, the rules to recover a debt are applied, which are different from the rules of *mudarabah* and *musharakah* investment.

Risk mitigation techniques used by Islamic banks for credit risk do not differ much from those used by conventional banks. Risk measurement can be achieved by maintaining good-quality data on past performances of the counterparty and by determining the probability of default. In many developing countries where there are no formal institutions to maintain credit data, banks often rely on the client's track record with the bank. In the absence of rating agencies and public disclosures, information about a client's creditworthiness has to be gathered through informal sources and local community networks.

Using collateral and pledges as security against credit risk is a common practice among all Islamic banks. The bank might ask the client to post additional collateral before entering into a *murabahah* transaction. In some cases, the subject matter of the contract is accepted as collateral. Posting collateral as security is not without difficulties, especially in developing countries. Typical problems include the illiquidity of the collateral or the inability of the bank to sell the collateral, and difficulties in determining the fair market value on a periodic basis. The most important of these, however, are the legal hindrances and obstacles in taking possession of the collateral. Due to weak legal institutions and slow processing, it becomes difficult for the bank to claim the collateral. In addition to collateral, personal and institutional guarantees are also accepted to minimize credit risk.

### **IFSB PRINCIPLES OF CREDIT RISK**

**Principle 2.1:** [Islamic Financial Institutions] shall have in place a strategy for financing, using the various Islamic instruments in compliance with *Shari'ah*, whereby it recognizes the potential credit exposures that may arise at different stages of the various financing agreements.

**Principle 2.2:** [Islamic Financial Institutions] shall carry out a due diligence review in respect of counterparties prior to deciding on the choice of an appropriate Islamic financing instrument.

**Principle 2.3:** [Islamic Financial Institutions] shall have in place appropriate methodologies for measuring and reporting the credit risk exposures arising under each Islamic financing instrument.

**Principle 2.4:** [Islamic Financial Institutions] shall have in place *Shari'ah*-compliant credit risk mitigating techniques appropriate for each Islamic financing instrument.

### **Market Risk**

Market risk for a financial institution arises in the form of unfavorable price movements such as yields (rate-of-return risk), benchmark rates (interest rate risk), foreign exchange rates (FX risk), equity and commodity prices (price risk) which have a potential impact on the financial value of an asset over the life of the contract. Islamic banks are further exposed to market risk arising from the volatility in the values of tradable, marketable or leaseable assets. The risks relate to the current and future volatility of market values of specific assets from different risk factors that include the following:

**Mark-up Risk** Islamic banks are exposed to mark-up risk as their mark-up rate used in *murabahah* and other trade-financing instruments is fixed for the duration of the contract while the benchmark rate may change. This means that the prevailing mark-up rate in the market may increase beyond the rate the bank had fixed in a contract and therefore the bank is unable to benefit from any increase. This is especially applicable to the *murabahah* contract, where the mark-up rate is fixed at the time of the contract. In the absence of any Islamic index of rate of return, Islamic banks often use LIBOR as the benchmark, which aligns their market risk closely with the movements in LIBOR rates.

**Price Risk** In the case of *bay' al-salam*, Islamic banks are exposed to commodity price volatility during the period between the delivery of the commodity and the sale of the commodity at the prevailing market price. This risk is

similar to the market risk of a forward contract if it is not hedged properly. In order to hedge its position, the bank may enter into a parallel (offsetting) *bay' al-salam* contract, leaving itself exposed to price risk if there is default on the first contract and the bank is obligated to deliver on the second contract.

**Leased Asset-value Risk** In the case of an operating *ijarah*, the bank is exposed to market risk over the life of the contract arising from a reduction in the residual value of the leased asset at the expiry of the lease term or, in the case of early termination, due to default.

**FX Risk** The movement of foreign exchange rates is another transaction risk arising from the deferred trading nature of some contracts offered by Islamic banks, as the value of the currency in which receivables are due may depreciate or the currency in which payables are due may appreciate.

**Securities Price Risk** With an increasing market for Islamic bonds (*sukuk*), Islamic banks invest a portion of their assets in marketable securities. However, the prices of such securities are exposed to current yields. Similar to a fixed-income security, the prices go down as yields go up and vice versa. Islamic banks holding such securities will be exposed to volatility in yields, unless they hold the security till maturity. Furthermore, the secondary market for such securities may not be very liquid, exposing the banks to distorted prices in an illiquid market.

### **IFSB PRINCIPLES OF MARKET RISK**

**Principle 4.1:** [Islamic Financial Institutions] shall have in place an appropriate framework for market risk management (including reporting) in respect of all assets held, including those that do not have a ready market and/or are exposed to high price volatility.

### **Equity Investment Risk**

IFIs are exposed to equity investment risk in profit/loss-sharing investments on the assets side. These include partnership-based *mudarabah* and *musharakah* investments. Typical examples of equity investments are holdings of shares in the stock market, private-equity investments, equity participation in specific projects or syndication investment.

This risk is unique to IFIs because conventional commercial banks do not invest on the basis of equity-based assets. Equity investments can lead to volatility in the financial institution's earnings arising from liquidity, credit, and market risks associated with equity holdings. Although there is credit risk in equity-based assets as discussed earlier, there is also considerable financial risk of losing capital invested as a result of business losses.



### **IFSB PRINCIPLES OF EQUITY INVESTMENT RISK**

**Principle 3.1:** [Islamic Financial Institutions] shall have in place appropriate strategies, risk management and reporting processes in respect of the risk characteristics of equity investments, including *mudarabah* and *musharakah* investments.

**Principle 3.2:** [Islamic Financial Institutions] shall ensure that their valuation methodologies are appropriate and consistent, and shall assess the potential impacts of their methods on profit calculations and allocations. The methods shall be mutually agreed between the institution and the *mudarib* and/or *musharakah* partners.

**Principle 3.3:** [Islamic Financial Institutions] shall define and establish the exit strategies in respect of their equity investment activities, including extension and redemption conditions for *mudarabah* and *musharakah* investments, subject to the approval of the institution's *Shari'ah* Board.

Some of the distinct features of equity investment risk are:

- The nature of equity investment requires enhanced monitoring measures to reduce informational asymmetries. These include proper financial disclosures, closer involvement with the project, transparency in reporting and supervision during all phases of the project from appraisals to completion. Therefore, Islamic banks need to play an active role in the process of monitoring, in order to mitigate this risk.
- Both *mudarabah* and *musharakah* are profit/loss-sharing contracts and are subject to loss of capital despite proper monitoring. The degree of risk in equity investments is higher than in other investments and, therefore, Islamic banks should take extreme care in evaluating and selecting the projects in order to minimize any potential losses.
- Equity investments (other than stock market investments) do not have secondary markets and therefore an early exit is costly. The illiquidity of such investments can cause financial losses to the bank.
- Equity investment may not generate a steady income, and capital gain might be the only source of return. This unscheduled nature of cash flows can pose difficulties for the Islamic banks in forecasting and managing the cash flows.

### **Business Risks**

Business risks are associated with a bank's business environment, including macroeconomic and policy concerns, legal and regulatory factors and the

overall infrastructure of the financial sector. Business risk also includes the risk of becoming insolvent as a result of having insufficient capital to continue operations. While IFIs are exposed to the regular business environment, solvency, and infrastructure risks, they are particularly exposed to one specific business risk—the rate-of-return risk.

### **Rate-of-return Risk**

The rate-of-return risk stems from the uncertainty in the returns earned by Islamic banks on their assets. This uncertainty can cause a divergence from the expectations investors have on the liabilities side. The larger the divergence, the bigger the risk. Another way of looking at this risk is that it is the risk generally associated with overall balance-sheet exposures where mismatches arise between assets and balances of the depositors. For example, an Islamic bank is expected to make five percent on its assets, which will be passed on to the investors/depositors. Meanwhile, if current market rates rise to six percent, which is higher than what the bank may make on its investment, the investment account holders/depositors may also expect to earn the same on their deposits.

The rate-of-return risk differs from interest rate risk in two ways. Firstly, since conventional commercial banks operate on interest-based fixed-income securities on the assets side, there is less uncertainty in the rate of return earned on their investments if investments are held till maturity. Since Islamic banks have a mix of mark-up based and equity-based investments, this uncertainty is higher. Secondly, the return on deposits in conventional banks is predetermined; in contrast, the returns on deposits in Islamic banks are expected but not pre-agreed. In addition, returns on some investments—those based on equity partnerships, for example—are not known accurately until the end of the investment period. If, during this period, the prevailing yield levels or expected rates of returns in the market change, then the investors may expect similar yields from the bank.

It therefore becomes the responsibility of Islamic banks to manage the expectations of their investment account holders/depositors, which makes the rate-of-return risk also a strategic risk issue as part of the business environment. Two sub-categories of rate-of-return risk have been identified, as follows:

***Displaced commercial risk:*** This was first identified by the AAOIFI as the risk that arises when an Islamic bank is under pressure to pay its investment depositors a rate of return higher than what should be payable under the “actual” terms of the investment contract. This may occur when the bank has underperformed during a period and was unable to generate adequate profits for distribution to the account holders.

To mitigate this risk, banks may decide to waive their portion of profits in order to dissuade depositors from withdrawing their funds and investing elsewhere. An extreme example was the action by the International Islamic Bank for Investment & Development in Egypt, which distributed all of its

profits to investment account holders while the shareholders received nothing from the mid to late 1980s (Warde 2000). In 1988, the bank distributed to its depositors an amount exceeding its profits, and the difference appeared in the bank's accounts as "loss carried forward." The practice of forgoing part or all of its shareholders' profits may adversely affect its own capital, which can lead to insolvency risk in extreme cases.

The experience gained from such self-imposed practices to mitigate the displaced risk has led to the development of two standard practices in the industry. The first practice is the maintenance of a Profit Equalization Reserve (PER), which the financial institution funds by setting aside a portion of the gross income before deducting its own share (as *mudarib*). The objective of the reserve is to maintain a cushion to ensure smooth future returns and to increase the owners' equity for bearing future shocks. Similar to the PER, an Investment Risk Reserve (IRR) is maintained out of the income of investment account holders/depositors after allocating the bank's share, in order to dampen the effects of the risk of future investment losses. It has been suggested that the basis for computing the amounts to be appropriated should be predefined and fully disclosed.

### **IFSB PRINCIPLES OF RATE OF RETURN RISK**

**Principle 6.1:** [Islamic Financial Institution] shall establish a comprehensive risk management and reporting process to assess the potential impacts of market factors affecting rates of return on assets in comparison with the expected rates of return for investment account holders (IAH).

**Principle 6.2:** [Islamic Financial Institution] shall have in place an appropriate framework for managing displaced commercial risk, where applicable.

While maintaining reserves in this way is becoming common practice, it has attracted objections as well. While the practice is in alignment with prudent risk management, it raises a governance issue that needs attention. Firstly, limited disclosure of such reserves makes investment account holders uneasy and they do not have the right to influence the use of such reserves and verify the exposure of overall investments. While those with long-term investment objectives may welcome this practice, those with a short-term view may feel that they are subsidizing the returns of the long-term investors. Some banks require investment account holders to waive their rights on these reserves.

IFIs should standardize the practice and the rights of their investment account holders to these reserves should be clearly stated and explained to

depositors. It has been suggested that making deductions from the profits belonging to investment account holders should apply only to long-term depositors, who are more likely to be exposed, and not to depositors who are not exposed to such risk.

**Withdrawal risk:** Withdrawal risk arises mainly from the competitive pressures an IFI faces from its Islamic or conventional counterparts. An Islamic bank could be exposed to the risk of withdrawals by its depositors as a result of offering a lower rate of return than its competitors. If an Islamic bank is run inefficiently and keeps producing lower returns, this will lead to withdrawals, which could eventually erode the franchise value of the bank.

### **Treasury Risks**

Treasury risks include those arising from cash management, equity management, short-term liquidity management, and assets-and-liabilities management (ALM). Generally, responsibility for the risk management function of a financial institution falls to the treasury and therefore any inability to manage risks properly can be a risk itself. Typical treasury risks that are critical for an IFI are liquidity, ALM, and hedging risks, as discussed below.

**Liquidity Risk** Liquidity is necessary for banks to compensate for any fluctuations (expected and unexpected) in the balance sheet and to provide funds for growth. It represents a bank's ability to accommodate the redemption of deposits and other liabilities and to cover the demand for funding in the loan and investment portfolio. A bank is said to have adequate liquidity potential when it can obtain needed funds (by increasing liabilities, or securitizing/selling assets) promptly and at a reasonable cost. The price of liquidity is a function of market conditions and the market's perception of the inherent riskiness of the borrowing institution.

Liquidity risk also results when the bank's ability to match the maturity of assets and liabilities is impaired. Such risk results from the mismatch between maturities on the two sides of the balance sheet, creating either a surplus of cash that must be invested or a shortage of cash that must be funded. Lack of liquidity adversely affects the bank's ability to manage portfolios in a diversified fashion and to enter or exit the market when needed.

Liquidity risk as it applies to Islamic banks can be of two types: lack of liquidity in the market, and lack of access to funding. In the first type, illiquid assets make it difficult for the financial institution to meet its liabilities and financial obligations. In the second, the institution is unable to raise funds at a reasonable cost, when needed.

Since an IFI will be acting as an asset manager and will not have access to funds through a debt security to meet its liquidity needs, it will be exposed

to liquidity risk if (i) it has not aligned its liabilities and assets on the same maturity ladder; or (ii) it has invested in market securities which suddenly face liquidity issues; or it had placed funds in customized over-the-counter assets (for example, special *mudarabah* and *musharakah* assets).

The current financial crisis has highlighted the significance of liquidity in the assets market. This further highlights the need for a robust secondary market and mechanisms to securitize the assets of financial intermediaries to facilitate liquidity in the markets.

The treasury management function becomes a challenging task affecting the performance of Islamic banks, since they are particularly vulnerable to liquidity risk, given their limited access to external funds to meet their obligations. For the following reasons, liquidity risk can be considered as one of the most critical risks faced by Islamic banks:

- The limited availability of *Shari'ah*-compatible money and intra-bank markets is the leading cause of the liquidity risk. Prohibition by *Shari'ah* law from borrowing on the basis of interest and the absence of an active interbank money market have restricted Islamic banks' options to efficiently manage their liquidity positions. Conventional banks have access to borrowing, from overnight to extended short-term maturity, through well-developed and efficient interbank markets. This access to short-term borrowing is vital for meeting short-term cash-flow needs.
- Shallow secondary markets are another source of the liquidity risk. The number of *Shari'ah*-compliant financial instruments that can be traded in the secondary market is limited. Therefore, there is a need for the further development of asset-backed tradable securities such as *sukuk*. Even where there are instruments currently available, the number of market participants is limited.
- Typical avenues of liquidity management available to conventional banks, namely the interbank market, secondary-market debt instruments, and discount windows from the lender of last resort (central bank), are all considered to be based on *riba* and therefore unacceptable.
- Certain characteristics of some Islamic instruments can also lead to liquidity risks. For example, cancellation risks in *murabahah*, or the non-permissibility of trading of contracts based on *murabahah* or *bay' al-salam*, pose liquidity problems.
- Islamic banks have a considerable amount of funds in current accounts which are demand deposits and can be withdrawn at any time. Repayment of principal amounts deposited by current-account holders is guaranteed by the bank without any rights to a share in the profits. Islamic banks may be investing only a small fraction of the current-account holders' funds and may be maintaining high levels of liquidity in the form of idle cash in the absence of illiquid short-term instruments.

### **IFSB PRINCIPLES OF LIQUIDITY RISK**

**Principle 5.1:** [Islamic Financial Institution] shall have in place a liquidity management framework (including reporting) taking into account separately and on an overall basis their liquidity exposures in respect of each category of current accounts, unrestricted and restricted investment accounts.

**Principle 5.2:** [Islamic Financial Institution] shall undertake liquidity risk commensurate with their ability to have sufficient recourse to *Shari'ah*-compliant funds to mitigate such risk.

Malaysia has taken significant steps to promote Islamic banks and to provide solutions to reduce liquidity risk. The central bank, Bank Negara Malaysia, introduced the Islamic Interbank Money Market (IIMM) in early 1994. The activities of the IIMM included the purchase and sale of Islamic financial instruments among market participants (including the central bank), interbank investment activities through the *Mudarabah* Interbank Investment (MII) Scheme and a check-clearing and settlement system through an Islamic Interbank Check Clearing System (IICCS). The Islamic financial instruments that are currently being traded in the IIMM on the basis of *bay' al-dayn* are what are known as Green bankers acceptances, accepted Islamic bills, Islamic mortgage bonds and Islamic private-debt securities. In addition, financial institutions can sell Government Investment Issues (GIIs) to the central bank, as and when required, to meet their liquidity needs. GIIs are government securities issued on an Islamic basis, which financial institutions can also buy from the central bank, depending on the availability.

**ALM Risk** Assets-and-liabilities management (ALM) risk is a balance-sheet mismatch risk resulting from the difference in maturity terms and the conditions of a bank's portfolio on its assets and liabilities sides. ALM comprises strategic planning, implementation, and control processes that affect the volume, mix, maturity, profit-rate sensitivity, quality, and liquidity of a bank's assets and liabilities. The primary goal of ALM is to produce a high-quality, stable, large, and growing flow of net income. This goal is accomplished by achieving the optimum combination and level of assets, liabilities, and financial risk.

ALM risk arises from the difference in maturity terms and conditions of a bank's portfolio on its assets and liabilities sides. In theory, Islamic banks should not be exposed to the same asset-liability mismatch, and therefore to equity-duration risk, as their conventional counterparts. This comparative advantage is rooted in the pass-through nature of Islamic banks, which act

as agents for investors/depositors and pass all profits and losses through to them. In addition, the risk-sharing feature in which banks participate with their counterparties and investors/depositors plays a critical role. Direct market discipline, one of the three main pillars recently emphasized by the Basel Committee on Banking Supervision in enhancing the stability of the international financial market, is embedded in this risk-sharing principle.

Following the theoretical model, any negative shock to an Islamic bank's asset returns is absorbed by both shareholders and investors/depositors. While depositors in the conventional system have a fixed claim on the returns to the bank's assets (receiving a predetermined interest rate in addition to their guaranteed principal, irrespective of the bank's profitability on its assets side), holders of profit-sharing investment accounts in the Islamic system share in the bank's profits and losses alongside the shareholders and are exposed to the risk of losing all or part of their initial investment. The assets and liabilities are matched as a result of the pass-through structure.

The risks of a financial intermediary are better understood when the sources and applications of funds under management by the financial intermediary are viewed as sub-portfolios of distinct risk/return and maturity profiles. Table 13.3 provides an overview of the sources and application of funds for a hypothetical IFI. The composition and mix of different maturity buckets on the assets side depend on each financial institution, which may select a mix to match its needs to those of its depositors.

Although, as per theory, an IFI will not be exposed to ALM risk in the traditional sense, it will face other challenges. Rather than matching the assets and liabilities at the balance-sheet level, the challenge becomes one of offering a wide range of products on the liabilities side to different classes of depositors/investors to meet their specific investment objectives. In other words, the IFI will have to design funds or portfolios to meet the risk/return objectives of its investors; otherwise, the investors would simply prefer to become shareholders. Although the contractual agreement between

**TABLE 13.3** Sources and application of funds

Sources (liabilities and equity)	Application (assets)
Equity capital and shareholders' reserves	Short-term trade finance ( <i>murabahah, salam</i> )
Demand and safekeeping deposits ( <i>amanah</i> )	Regulatory cash-reserve requirement Medium-term investment ( <i>ijarah, istisna'</i> )
Investment accounts ( <i>mudarabah</i> ) "pass-through"	Long-term partnerships ( <i>musharakah</i> )
Special investment accounts ( <i>mudarabah, musharakah</i> )	Fee-based services ( <i>jo'alah, kifala</i> , and so forth)

Source: van Greuning and Iqbal (2008)

the IFI and the investors/depositors would be based on a risk-sharing and profit/loss-sharing basis, the IFI still has to design investment products for varying risk appetites and maturity ladders.

In that case, the ALM exposure becomes merely an operational matter of aligning products on the liabilities side to the portfolios on the assets side, and the challenge would be to ensure that the funds are not comingled across investor classes and maturity ladders. This requires ensuring transparency in the management of different portfolios.

In this respect, the IFI's role in the financial system would be similar to that of a conventional asset manager and the balance sheet would resemble a fund-of-funds, which would not be exposed to any ALM risk but would be subject to operational risks.

**Hedging Risk** Hedging risk is the risk of failure to mitigate and manage different types of risks. This increases the bank's overall risk exposure. In addition to non-availability of derivative products to hedge risks, illiquid, non-existent and shallow secondary markets are other sources of the increasing hedging risk of the Islamic banks.

### **Governance Risks**

The importance of governance and the risks associated with poor governance have recently attracted the attention of researchers and policymakers. Governance risk refers to the risk arising from a failure in governing the institution, negligence in conducting business and meeting contractual obligations, and from a weak internal and external institutional environment, including legal risk, whereby banks are unable to enforce their contracts.

### **Operational Risk**

A related type of governance risk is operational risk, defined as the risk of loss resulting from the inadequacy or failure of internal processes, as related to people and systems, or from external risks. Operational risk also includes the risk of failure of technology, systems and analytical models. It is argued that operational risks are likely to be significant in the case of Islamic banks because of their specific contractual features and the general legal environment. Specific aspects that could increase operational risks in Islamic banks include:

- Cancellation risks in the non-binding *murabahah* and *istisna'* contracts
- The failure of internal control systems to detect and manage potential problems in the operational processes and back-office functions, and technical risks of various sorts
- Difficulties in enforcing Islamic contracts in a broader legal environment
- The need to maintain and manage commodity inventories, often in illiquid markets



- The costs and risks in monitoring equity-type contracts and the associated legal risks.

People risk is another kind of operational risk and arises from incompetence or fraud that leads to potential losses. For instance, an internal-control problem cost the Dubai Islamic Bank US\$50 million in 1998 when a bank official did not comply with the bank's credit terms. This also resulted in a run on its deposits of US\$138 million, representing 7 percent of its total deposits, in just one day (Warde 2000).

Operational risk is considered high on the list of exposures of Islamic banks. A survey conducted by Khan and Ahmed (2001) shows that the managers of Islamic banks perceived operational risk as the most critical after mark-up risk. The survey found that operational risk is lower in fixed-income assets of *murabahah* and *ijarah* and one of the highest in the deferred-sale contracts of *salam* and *istisna'*. These rankings of the instruments indicate which contracts the banks find more complex and difficult to implement.

### **Fiduciary Risk**

Fiduciary risk is the risk that arises from an institution's failure to perform in accordance with explicit and implicit standards applicable to its fiduciary responsibilities. Fiduciary risk gives rise to the risk of having to face legal action in a situation where the bank breaches its fiduciary responsibility toward depositors and shareholders. As fiduciary agents, Islamic banks are expected to act in the best interests of investors/depositors and shareholders. If and when there is divergence between these expectations and its actions, the bank is exposed to fiduciary risk.

The following are some examples of fiduciary risk:

- In the case of a partnership-based investment in the form of *mudarabah* and *musharakah* on the assets side, the bank is expected to perform adequate screening and monitoring of projects and any negligence in this regard—deliberate or inadvertent—can lead to fiduciary risk. It becomes incumbent upon management to perform due diligence before committing the investors/depositors' funds.
- The mismanagement of funds of current-account holders, which are accepted on a trust (*amanah*) basis, can expose the bank to fiduciary risk as well. It is a common practice of Islamic banks to utilize such funds without any obligation to share the profits. However, in a case of heavy losses on the investments financed by these funds, the depositors can lose confidence in the bank and this can lead to their seeking legal redress.
- Mismanagement that leads to the incurring of unnecessary expenses, or allocating excessive expenses to investment account holders is a breach of the implicit contract to act in a transparent fashion.

Fiduciary risk can lead to dire consequences. First, it can damage a bank's reputation and create panic among depositors, who may decide to withdraw their funds. Secondly, it may result in legal action that can lead to a financial loss in the form of penalties or compensation payments. Thirdly, it can have a negative impact on the market price of shareholders' equity and on the bank's costs and access to liquidity. Where a bank is unable to meet the demands of its current and investment account holders, it may lead to insolvency.

### **Transparency Risk**

Transparency is defined as "the public disclosure of reliable and timely information that enables users of that information to make an accurate assessment of a bank's financial condition and performance, business activities, risk profile and risk-management practices." Accordingly, lack of transparency creates the risk of incurring losses from bad decisions based on incomplete or inaccurate information. Islamic banks are exposed to transparency risk by the practice of non-standard accounting and financial reporting of Islamic financial instruments, which are different from conventional instruments and therefore require different conventions of reporting to truly reflect the financial picture. Transparency also demands that all banks in the system use a uniform set of standards, which is not the current practice.

### **Shari'ah Risk**

*Shari'ah* risk is related to the structure and functioning of the *Shari'ah* boards at the institutional and systemic level. This risk is of two types: the first comes from non-standard practices in respect of different contracts in different jurisdictions; the second is the result of failure to comply with *Shari'ah* rules. For instance, while some *Shari'ah* scholars consider the terms of a *murabahah* or *istisna'* contract to be binding on the buyer, others argue that the buyer has the option to decline even after placing an order and paying the commitment fee. While each practice is acceptable to different schools of thought, the bank's risk is higher in non-binding cases and it may lead to potential litigation problems in unsettled transactions.

Banks are exposed to the risk of non-compliance with the *Shari'ah* rules and principles determined by the *Shari'ah* board or the relevant body in their particular jurisdiction. The nature of the relationship between the bank and the investors/depositors is not only that of an agent and principal, but it is also based on an implicit trust between the two that the agent will respect the desires of the principal to fully comply with the *Shari'ah*. This relationship distinguishes Islamic banking from conventional banking and is the sole justification for the existence of the Islamic banks. If the bank is unable to maintain this trust and its actions lead to non-compliance with the *Shari'ah*, it runs the risk of breaking the confidence of its investors/depositors. Breaching this trust can have dire consequences, including the withdrawal and insolvency risk. Therefore, the bank should give high priority to ensuring transparency