

Financial Engineering in Islamic Finance

Zamir Iqbal

ABSTRACT

This paper examines the scope of financial innovation and engineering within the context of an Islamic financial system. It discusses the significance of innovation in Islamic financial markets, the process and scope of introducing new products in the market, and an Islamic form of asset-securitization, and evaluates the structure of a commodity swap transaction to determine its validity. The paper concludes that contrary to common belief, the system offers the basic building blocks that can be used to build more complex instruments to enhance liquidity and offer risk management tools. With the introduction of asset securitization and swap transactions conforming to Islamic principles, the issues of secondary markets and risk management can be dealt with.

I. INTRODUCTION

Islamic financial markets have earned due recognition from international financial markets in the past decade by demonstrating the viability and practicality of banking compatible with the principles of Islamic finance. Their phenomenal success and growth is the result of increased demand for Islamic financial products reciprocated by financial intermediaries. The long-term presence of Muslim and non-Muslim financial institutions in the market is a vote of confidence and a sign of recognition. Islamic banking is not confined to the boundaries of Muslim countries anymore but is gaining roots in non-Muslim countries as well. Furthermore, its clientele base is no more restricted to Muslims only.

The market is currently facing the major task of how to maintain upswing momentum and to achieve sustainable growth. Market size, both in terms of asset base and annual turnover, is still considered far below its true potential because the market is plagued by a lack of depth and breadth, which are characteristics of a market with a limited set of instruments. The process of innovation is complex and sensitive, as it requires multi-disciplinary considerations involving a deep understanding of Islamic jurisprudence. All these factors make the process of innovation slow. Today's market is exhibiting a great demand for innovate instruments to enhance market liquidity, develop a secondary market, and perform risk management.ⁱ

Section I discusses the significance of innovation in Islamic financial markets. Section II discusses the process and scope of introducing new products in the market. Section III illustrates an Islamic form of asset-securitization as an example of financial engineering. Section IV evaluates the structure of a commodity swap transaction to determine its validity. Finally, section V concludes the discussion.

II. SIGNIFICANCE OF INNOVATION IN ISLAMIC FINANCIAL MARKETS

The 1980s witnessed rapid introduction of financial innovations in international financial markets. Financial innovations transformed the traditional financial and banking markets into highly sophisticated markets featuring high degree of liquidity and wide-array of instruments to share and transfer various sources of risk. The trend occurred in both domestic and international financial markets. Demand for liquidity enhancing and risk management instruments was prompted by increased volatility in financial assets prices due to the breakdown of 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 the financial theory, breakthroughs in the information processing and communication technology and deregulation of financial markets.ⁱⁱ

Bank for International Settlement (BIS) identifies three types of financial innovation activities with the most significant impact on the markets—innovations to enhance liquidity, to transfer risk (price and credit), and to generate revenues (from credit and equity).ⁱⁱⁱ Marketability, negotiability and transferability of financial claims create liquidity by expanding the menu of options available to market participants. Derivatives apart from risk-sharing make markets more complete and create important additional social benefits such as the dissemination of

ⁱ Iqbal is an Information Officer in the Financial Operations Department of the World Bank in Washington, D.C.

uniform prices upon which investment decisions can be made, and the lowering of transaction cost in the capital markets.^{iv} In the long run, financial development and innovations exhibited a positive impact on the economic growth of the countries.

Presently, Islamic financial markets are deficient in both liquidity and risk management tools. Basic building blocks in Islamic financial system are geared toward promotion of trade and partnership because Islam encourages trade, entrepreneurship, and risk sharing. Current market composition is dominated by number of short-term traditional trade (cost-plus financing/*murabaha*) and sales (markup or leasing/*ijara*) financial transactions whereas size of equity-based instruments for medium- to long-term is relatively small. Short-term trade and sales related instruments constitute approximately 85-90% of all transactions while the rest are equity-related transactions. Table 1 provides market composition as of early 90s.

TABLE 1. PORTFOLIO DISTRIBUTION OF ISLAMIC BANKS

Instrument	1989	1990
Short Term <i>Murabaha</i>	75.4%	75.6%
Mutagra and Real Estate	15.4%	15.5%
Medium-term Investment	5.4%	5.4%
Equity Participation	1.4%	1.4%
Long-term Islamic Investment	2.1%	1.3%
Social Lending	0.3%	0.3%

Source: Data compiled by International Association of Islamic Banks.^v

The demand for medium-term financing is met by profit-sharing agreements (*mudaraba*) and equity partnership (*musharaka*) instruments. Although both profit sharing and equity participation are also used for long-term financing, these choices are limited. Even when such choices are available, investors exhibit less enthusiasm and are hesitant to commit funds and resources due to difficulties and cost associated with liquidating the asset at times of need.

Secondary markets in Islamic financial markets are shallow, under-developed, and inefficient.^{vi} Lack of efficient secondary markets and liquidity in the Islamic financial markets has indirectly limited the range of maturity structures available to the investor. Due to absence of liquidity, Islamic bankers can not easily expand portfolios across capital markets and are restricted to limited opportunities for portfolio diversification. This presents a challenging opportunity to develop highly liquid instruments to satisfy demands of the investors and the users of funds seeking medium- and long-term maturity structure with the flexibility of adjusting portfolios at the lowest cost.

Risk management products are still foreign to Islamic financial markets. This is not because Islam does not recognize the need for risk management but is due to lack of research in this area. In reality, Islam imposes greater responsibility of prudent identification and sharing of risks. It is obvious that further growth of Islamic financial markets will largely depend on the development of secondary markets and introduction of innovative products to enhance liquidity and risk management.

III. PROCESS AND 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, e.g. return, price risk, credit risk, country risk, etc. Today's highly liquid instruments and derivatives are nothing but a

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

The process of introducing a new product is subject to several rules governing Islamic economic and financial system defined by Islamic law (*Shari'ah*).^{vii} The process of determining the legitimacy of a new product involves approval by religious boards representing different schools of thought in Islamic jurisprudence. Each financial institution has a special board of religious scholars to whom all new products are referred for approval.^{viii} The religious board may seek the approval of the Supreme Religious Board in countries where it exists and this board may confer with the International Association of Islamic Banks (IAIB) in its decisions.^{ix}

From legal point of view, any instrument is acceptable as legitimate financial instrument provided it does not incorporate certain elements considered unlawful in Islam. An Islamic financial contracts or instruments must be free of *riba* (a fixed and pre-determined return similar to interest), *gharar* (existence of asymmetrical information and uncertainty), *qimar* (gambling) and *ikrah* (coercion). Prohibition of *riba*, a term literally meaning 'an excess' and interpreted as 'any unjustifiable increase of capital whether in loans or 'sales' ' is the central tenet of Islamic financial system.^x More precisely, any positive, fixed, pre-determined rate tied to the maturity and the amount of principal (i.e. guaranteed regardless of the performance of the investment) is considered *riba* and is prohibited.^{xi} *Gharar* in a contract arises where there is lack of knowledge or there is a reasonable doubt in the control of either party to the contract over the completion of exchange.^{xii} *Qimar* refers to gambling, bets, and wagers. The essence of gambling is that of taking a risk deliberately, created or invited, which is not an accessory to the economic activity, to gain thereby.^{xiii} *Ikrah* is coercion or imposing a contract or a condition on an unwilling party.

It is important to recall that while Islam prohibits pre-determined fixed returns such as interest, it in no way denies a rate of return from legitimate economic activity. The demarcation between interest and return is critical. Islam forbids a fixed, or a pre-determined return, on financial transactions but allows uncertain rate of return such as that represented by profits.^{xiv} Concepts of time value of capital and the use of an expected rate of return or a pseudo discount rate based on the riskiness of the asset for financial valuation is by no means un-Islamic.^{xv} Finally, the notion of cash flows collateralized against an underlying asset—another essential tool of financial engineering—is very much compatible with the principles of Islam who promotes investment in real sector.

Although, understanding of *Shari'ah* approved financial instruments is important for any form of financial engineering in Islam, it is also very critical to understand the laws governing the contracts in Islam. 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 above-mentioned elements of *riba*, *gharar*, *qimar*, and *ikrah*. In addition, it is extremely critical to distinguish between the sales contracts and financial contracts. While the instruments of sales transactions such as *murabaha*, installment sales or *salaf* may resemble an interest-based transaction are allowed and recognized by *Shari'ah* but the same is not true when it comes to investments or raising of capital which should be on the basis of profit-sharing.

Modern finance theory and subsequent financial innovations are pivoted on the concept of pre-determined 'interest', which has become integral part of all major asset-pricing models. Any attempt of financial engineering to create a new instrument without any reference to 'interest' appears a challenging task. Two different approaches can be taken to apply financial engineering in Islamic finance. First, is to take an existing instrument in conventional system and make an evaluation of each component to find the closest substitute from the set of basic Islamic instruments. This approach is synonymous to reverse engineering. Extreme care is required in this approach to avoid any misidentification of close substitutes. Also, this approach may be used only for determining the legitimacy of a product for approval purposes. Second approach is to design and invent new instruments using Islamic instruments by applying principles of financial engineering. The result will be new array of instruments with each having unique risk-return profile. Since this approach requires 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.

Next two sections present a case for asset securitization and commodity swaps to illustrate the application of financial engineering in Islamic financial system.

IV. SECURITIZATION

Formally, the term 'Securitization' is often referred to the process of enhancing marketability, negotiability, and liquidity of an otherwise dormant asset. It allows hitherto relatively illiquid securities to be transformed into risk-diversified, high return vehicles for intermediating funds.^{xvi} It involves packaging a pool of homogeneous

assets that are normally not traded into tradable securities. This has been done either by using the original assets as collateral for a new tradable security that is issued (collateralized obligation) or by issuing a new tradable security that is being serviced by the proceeds of the original asset (pass-through security).^{xvii} The most prevalent forms of successful securitization in Western financial markets are securities backed by mortgages, car loans, leases, and receivable from inventory, credit cards and service centers like health care providers.

The securitization process involves five primary parties: the originator, the purchaser (typically an affiliated trust), the structurer or the underwriter, the guarantor and the servicer. The originator is the original owner of the financial asset who desires to liquidify the asset by taking the asset off the balance sheet. The originator benefits by getting the asset off the balance sheet while other parties earn fee income for their respective role. The structurer normally establishes purchaser of the asset in the form of a Special Purpose Vehicle (SPV) to serve as a trust. The asset side of the SPV's balance sheet reflects the securitized asset and the liability side contains the certificates or notes issued against such assets. Special Purpose Vehicle (SPV) is setup in the form of a trust or in any other form that may be suitable considering the tax and accounting application of the deal. Guarantor plays the role of the credit enhancer to stamp the certificates with the investment grade credit rating. Finally, the function of servicing of the asset—often kept to itself by the originator—is performed for a per-determined fee.

Let's examine the mapping of the securitization process in conventional system to the framework of Islamic finance. Leasing (*ijara*) is a well-established and recognized Islamic instrument with reasonable market size that offers medium- to long-term financing for capital goods and equipment required by projects. Leasing is a good candidate for Islamic asset securitization due to several reasons. First, leases are by definition asset backed so that investors are not exposed to any credit risk. Second, it provides a collateralized and steady stream of cash flows—a desired feature for successful securitization. Third, leases can be fixed or floating rate, hence offering more flexibility and opportunity for better assets-liabilities matching. Finally, there are similarities between Islamic lease and conventional lease that makes the instrument attractive to non-Muslim investors; thus expanding the investor base and strengthening the integration of capital markets.

For the origination phase, Islamic financial institutions who wish to securitize can collect homogeneous lease contracts, i.e. auto or equipment leases with similar maturities into a pool. Given the current size of the market, institutions may not hold assets individually which can permit cost effective securitization but collectively, a large sized pool can be launched through a form of syndication. A *mudaraba* (Islamic form of trust financing) formed as a trust to undertake a special task can easily substitute the role of Special Purpose Vehicle (SPV). Different forms of *mudaraba* can be formed to optimize functionality with the applicable tax and regulatory implications. The structure of the balance sheet of the *mudaraba* will be identical to the balance sheet of SPV, i.e. pool of leases on the assets side and certificates issued to the investors on the liabilities side.^{xviii}

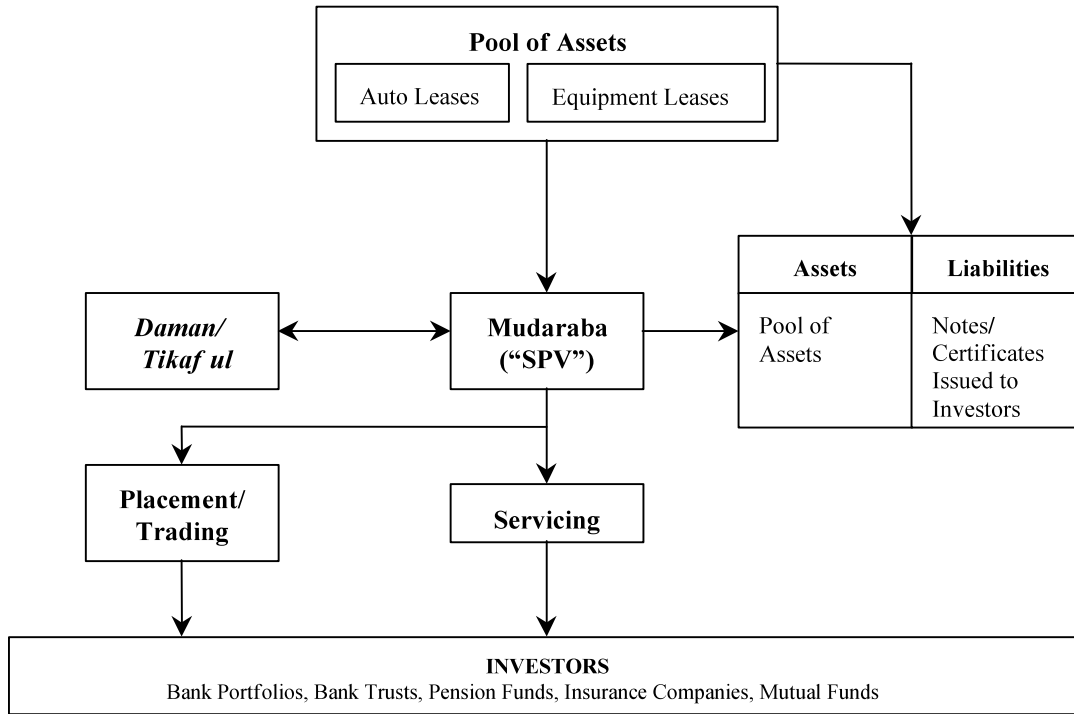
The element of credit enhancement or underwriting in conventional securitization may not have an exact substitute in Islamic securitization. Also, finding an exact substitute is not the objective. The whole notion of credit enhancement in conventional securitization is very critical as it stamps the secured certificates with investment grade rating. Similar function in Islamic finance can be emulated through an instrument based on the principles of Islamic guarantee (*daman*) or suretyship (*kifala*) or insurance (*takaful*).

Daman is a form of contract by which one person joining himself to another person, and binding himself also to meet the obligations which accrues to that other person.^{xx} Similarly, *kifala* relating to financial claims implies an obligation to pay in the event of the principal debtor's inability to honor his obligation.^{xx} Appropriate form of guarantee for securitization will be the guarantee of property whereby a person becomes guarantor for the payment at present or at a future date. In the case, where several persons constitute themselves as sureties for one debtor and for one the same debt, the creditor can only claim from each co-surety the amount each has given guarantee for unless they have constituted themselves jointly and severally liable.^{xxi} Critical assumption is that the contract of *daman* (guarantee) which is applicable to a person can be extended to an entity with limited liability such as a corporation.

Alternatively, *takaful*, Islamic insurance, can also provide the function of credit enhancement but in a different way than *daman* (guarantee). A *takaful* fund can be established to cover future losses or inability to perform. A fee charged as part of servicing the asset can finance this fund and any surplus or residual after deducting costs can be distributed back to the subscribers as the maturity approaches. The remaining parts of securitization, i.e. placement, trading and servicing can be replicated in Islamic finance without requiring any special instrument. Based on the analysis in the preceding section, it is clear that securitization of assets can be implemented in Islamic finance. Typical applications of assets securitization can be in the area of leasing, commodities, equities, and trade and export receivables.

Figure 1 illustrates the structure of lease securitization within the framework of Islamic finance.

FIGURE 1. STRUCTURE OF ISLAMIC ASSET SECURITIZATION



V. COMMODITY SWAP

The phenomenal development of the swap market is undoubtedly one of the most significant development in international capital markets over the past decade. Incomplete markets and market inefficiencies are often put forth as arguments to explain the economic rationale for swaps.^{xxii} More recently, market integration and high degree of interlinkages across segments of financial markets, internationalization of financial markets, increased volatility in security prices and increased demand for off-balance-sheet instruments to perform asset/liability management are cited for this rapid growth. Bulk of volume in swaps markets is consists of interest rate and currency swaps with extensive variations followed by relatively small fraction of commodity and equity swaps.

Swap deals are not practiced in Islamic financial markets mainly because the instrument is suspected to incorporate 'interest'—a prohibited element in Islamic finance. This objection is understandable in case of interest rate and currency swaps, however one can argue that the case of commodity swaps is different. Discussion below demonstrates that simple form of commodity swap could be recognized as valid contract which does not violate any *Shari'ah* rules and therefore could be considered acceptable by Islamic financial markets. Acceptance of commodity swap can be of great significance as oil producing Muslim countries of Persian Gulf can utilize the instrument to hedge against unexpected and unfavorable price movements and can achieve price risk managing, forecasting and planning for the future. This can ultimately lead to better policy management and stability in balance of payment.

Commodity swap is a term utilized to refer to a special class of financial exchange transactions in which counterparties agree to exchange cash flows related to commodity prices with the objective of managing commodity price risks.^{xxiii} One of the basic or plain vanilla type of commodity swap is a 'fixed-for-floating' commodity price swap where an end user (producer) fixes the purchase (sale) price of its commodity relative to an agreed established market pricing benchmark for the commodity for an agreed period of time.^{xxiv} The purpose of the swap is to hedge

against future price risk. Coverage of commodity types includes crude oil, marine fuel, heating oil, naphtha, gasoline, natural gas, precious metals (gold, silver and platinum), base metals (copper and aluminum) and variety of agricultural products such as wheat. Most of these commodities are non-perishable for which there are published price indices, a liquid market in the physical products and a variety of both buyers and sellers. Also, exchange-traded futures markets already exist for many “swappable” commodities.^{xxv}

In order to examine the legitimacy of commodity swap, one needs to understand the structure and the pricing mechanism of a simple ‘fixed-for-floating’ price commodity swap to evaluate if it violated any *Shari’ah* rules. In terms of the structure, like any swap, a commodity swap is nothing but a portfolio of forward contracts of different maturities. Each forward contract is a sales or purchase agreement to sell or purchase specified quantities of commodity to be delivered in the future at a pre-determined price and pre-determined date. Given that swap is a series of forward contracts, a commodity swap can be priced as portfolio of forward contracts on the commodity [utilizing forward prices].^{xxvi}

The forward price of a commodity is an assessment of the future price of underlying commodity at delivery based on today’s information and market expectations. In this capacity, forward markets serve the purpose of ‘price discovery’—the process of determining the equilibrium prices that reflect current and prospective demands for current and prospective supplies, and making these prices visible to all.^{xxvii} Major factors determining theoretical [an arbitrage-free and equilibrium] forward price of a commodity are the spot price, the yield curve “carry” cost and storage/holding/transportation costs.^{xxviii} Inclusion of the yield-curve “carry” in the model is purely to demonstrate that the forward price is arbitrage-free. As oppose to theoretical price, actual future price of commodity is greatly influenced and is determined by future demand/supply, price expectations, and price/volume elasticity of the commodity.

A “fix-for-floating” commodity price swap can also be viewed in Islamic finance as series of sales *contracts* for future delivery with varying periods. In simple words, it is a ‘price fixing’ contract where user and producer of the commodity mutually agree to exchange pre-determined quantity of commodity at a pre-determined price for a period of time in the future. Islamic sale contract *bai’ salam* is the closest substitute for the forward contract.^{xxix} *Bai’ salam* is a sale contract in which either advance payment is made to the seller or the rate is fixed at conclusion of contract for deferred supply of goods.^{xxx} There is unanimous consensus on permissibility of *salam* but differences exist on actual execution and implementation of the contract.

General conditions governing *salam* are that the commodity should be delivered on a specific future date after signing the contract, amount of principal [price times quantity] paid should be known, principal should be paid in advance, place of delivery should be specified, the contract should not allow options, principal paid should be in the form of money, and the two transacted items should not be of the kind whose exchange would lead to *riba*.^{xxxi} In early days of Islam, *bai’ salam* was restricted to a number of selected commodities. However, the later jurists unanimously treated it as a permissible mode of business and extended the list to all those commodities that could be precisely determined in terms of quality and quantity.^{xxxii}

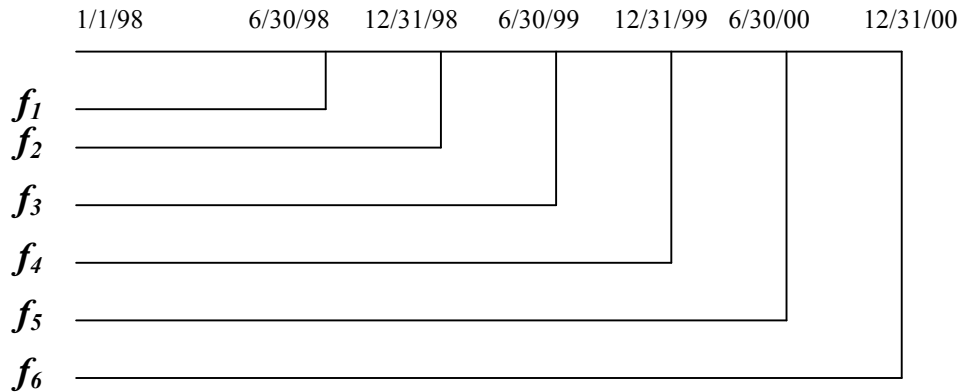
In spite of this acceptability, *bai’ salam* is not popular in Islamic financial markets, mainly for two reasons. First, it is required that as opposed to the conventional forward contract, full payment is made at the time of agreement in case of *bai’ salam*.^{xxxiii} Delaying payment or payment in installment voids the contract. Second, it is considered that since interest is incorporated in the pricing model of forward price, it is synonymous to paying or receiving interest as prohibited by Islam. One can argue that the first condition can be satisfied in different ways subject to acceptability by *Shari’ah*. Depositing received principal with the counter party is permissible implying that a *salam* seller may deposit the amount of principal he receives with the same bank that he deals in *salam* with.^{xxxiv} Therefore, simply establishing a non-interest bearing margin account with the Bank may satisfy this requirement. One can also argue that condition of making full payment at the time of contract can be met through a *daman* (a guarantee) by a financial institution undertaking the responsibility of performance and payment of principal on demand.^{xxxv}

As far as the objection of incorporating *riba* in forward contract is concerned, one needs to view forward from a different angle by considering it purely as a valid (legal) contract of sale. First, it is a legitimate right of the producer and the user of commodity to agree on a fixed price of exchange where price for future delivery can be different from spot. A misunderstanding arose when early Arabs rationalized and believed that interest (*riba*-in-debt) is similar to gain in trade exchanges (*riba*-in-barter) without realizing that the price and the profit concluded or agreed to in the original contracts of exchange, in particular the deferred contracts of exchanges, is not the same as *riba*.^{xxxvi} Second, in an efficient market forward price is only an unbiased predictor of the future price. Unlike other derivatives such as currency or interest rate futures where pricing is direct function of interest rate, forward price of a commodity depends on multiple factors with complex relationships. Third, since forward is a sales contract to be executed by genuine need of hedging, the question of indulging in payment or receipt of interest will not arise.

Finally, any other pricing model based on time series or regression that does not refer to any interest rate may be used.

Figure 2 illustrates replication of a 3 year, semi-annual resets, for 100k barrels of oil swap settling on 1/1/98 using Islamic instruments:

FIGURE 2. REPLICATION OF FIXED-FOR-FLOATING COMMODITY PRICE SWAP AGREEMENT



Each f_n is a (*bai' salam + daman*) for the nth maturity. The price for each f_n can be mutually determined by the counter parties.^{xxxvii}

VI. CONCLUSION

Financial engineering has clearly reshaped western markets in the last two decades by introducing highly sophisticated and liquid secondary markets and derivative products. Contrary to common belief, Islamic financial system also provides basic building blocks and the flexibility to construct innovative financial products. The survival and further development of Islamic financial markets largely depend on the nature of financial innovation introduced by market players. Long-term sustainable growth can be achieved by developing a well functioning secondary market and introducing liquidity enhancing and risk-sharing products. Securitization will help the development of a secondary market and the introduction of negotiable and marketable financial instruments. A well developed secondary market and the availability of derivatives would also strengthen the integration of Islamic markets with other markets as there will be common tools to conduct financial transactions. In the absence of financial innovations, Islamic financial markets may lose the current growth momentum and may not be able to achieve their true potential.

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- ⁱ Hossein Askari and Zamir Iqbal, 'Opportunities in Emerging Islamic Financial Market,' *Banco Nazonaile De Lavarro Quarterly Review*, September 1995.
- ⁱⁱ Philippe Jorion and Marcos Da Silva, *The Importance of Derivative Securities Market to Modern Finance*, (Chicago: Catalyst Institute, 1995), p 5.
- ⁱⁱⁱ Bank for International Settlement, *Recent Innovations in International Banking*, (Basle: Bank for International Settlement (BIS), April 1986), pp. 130-139.
- ^{iv} Philippe Jorion and Marcos Da Silva (1995:3).
- ^v Farah G. Fadil, 'Central Banks and Interest Free Banking: Some Theoretical and Practical Underpinnings,' *Proceedings of Islamic Banking and Finance Conference in Dubai*, p. 15.
- ^{vi} Askari and Iqbal (1995).
- ^{vii} In Islam, any activity—economic, social, political, religious—is governed by the set of Islamic laws known as *Shari'ah*. *Shari'ah* is constituted from three sources: the Qur'an, the *Sunna*, and the *ijma'*. The Qur'an is the divine law whereas *Sunnah* comprises of the sayings, the actions and the practices of the Prophet Muhammad (PBUH), or his acknowledgments or implicit approval of certain actions. *Ijma'* (collective reasoning) is the unanimity of consent by Muslim theologians and the experts on the knowledge of Islamic jurisprudence (*fiqh*). The process of interpretation of jurisprudence in light of the Qur'an, the *Sunnah*, and the *ijma'* is called *ijtihad*.
- ^{viii} The role of *Shari'ah* Council in most of Muslim countries is only of an advisory nature and the institution of *Shari'ah* Council at government level is non-existent in almost all the non-Muslim countries. Therefore, the Council's capability to maintain Islamic injunctions is dependent upon its legal status and the extent of implementation of its opinions. As a simple generalization, many Islamic banks belong to the International Association of Islamic Banks (IAIB).
- ^{ix} Hussain Lawai, 'The Role of *Shari'a* Council in Developing Banking Products,' *Proceedings of Islamic Banking and Finance Conference in Dubai*, 1994.
- ^x For further discussion of *Riba* and Islamic economics system, please refer to Abbas Mirakhor, 'General Characteristics of An Islamic Economic System,' in *Essays on Iqtisad: The Islamic Approach to Economic Problems*, ed. Baqir Al-Hasani and Abbas Mirakhor, (Nur Corp., MD, USA), pp.45-80. Mohsin S. Khan and Abbas Mirakhor, 'Islam and The Economic System,' *Review of Islamic Economics*, Vol. 2, No. 1 (1992), pp 1-29.
- ^{xi} All schools of thought agree that *Riba* is not simply usury as often perceived by some. There is now a consensus that this prohibition covers all forms of interest, including excessive interest and the indexing of capital.
- ^{xii} Nabil A. Saleh, *Unlawful Gain and Legitimate Profit in Islamic Law*, 2nd ed., (London: Graham and Trotman, 1992).
- ^{xiii} Aqdas Ali Kazmi, 'Islamic Financial Instruments,' *Journal of Islamic Banking and Finance* 11, (Jan.-Mar. 1994), pp. 42-43.
- ^{xiv} Mohsin S. Khan, 'The Framework and Practice of Islamic Banking,' in *Theoretical Studies in Islamic Banking and Finance*, ed. Mohsin S. Khan and Abbas Mirakhor (Texas: The Institute of Islamic Studies, 1987), pp. 1-15.
- ^{xv} Mohammed Anas Al-Zarqa, 'An Islamic Perspective on the Economics of Discounting in Project Evaluation,' in *An Introduction to Islamic Finance*, ed. Shaykh Ghazali Shaykh Abod, Syed Omar Syed Agil, and Aidit Haji Ghazali, (Kuala Lumpur: Quill Publishers, 1992), pp 94-125.
- ^{xvi} Sylvester Johnson and Amelia A. Murphy, 'Going Off the Balance Sheet,' *Federal Reserve Bank of Atlanta Economic Review*, September/October 1987, p. 30.
- ^{xvii} International Monetary Fund, *International Capital Markets: Developments, Prospects, and Policy Issues*, (Washington, DC: International Monetary Fund, 1988). p. 36.
- ^{xviii} Zamir Iqbal, 'Scope of Asset Securitization in Islamic Finance,' *Journal of Islamic Banking and Finance*, (Oct.-Dec. 97).
- ^{xix} The Mejlle, Book III, Arab Law Quarterly, 1987, p. 158
- ^{xx} S. M. Hasanuzzaman, 'Islamic Law and Finance,' *Encyclopaedia of Islamic Banking and Insurance*, London, 1995, p. 82.
- ^{xxi} Abdur Rahman I. Doi, *Shari'ah: The Islamic Law*, (Ta Ha Publishers, London, 1984), p.369.
- ^{xxii} D. Wall and John J. Pringle, 'Alternative Explanations of Interest Rate Swaps: A Theoretical and Empirical Analysis,' *Financial Management*, (Summer 1989), pp 59-70.
- ^{xxiii} Satyajit Das, *Swap and Derivative Financing*, (Irwin Professional Publishing, Chicago, 1994), p. 492
- ^{xxiv} Satyajit Das (1994:491).
- ^{xxv} Satyajit Das, Forward March, Risk, vol. 60, no. 2, February 1993, p. 41.
- ^{xxvi} Satyajit Das, (1994:502)
- ^{xxvii} Philippe Jorion and Marcos Da Silva (1995:2-6).

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- ^{xxviii} Satyajit Das, (1994:503)
- ^{xxix} For a detailed review of *Bai' Salam*, please consult Umar, Mohammad Abdul Halim, *Shari'ah, Economic and Accounting Framework of Bai' Salam in the Light of Contemporary Application*, Islamic Research and Training Institution Research Paper No. 33, (Jeddah: Islamic Research and Training Institution, 1997).
- ^{xxx} Rayner, S. E., *The Theory of Contracts in Islamic Law*, 1st ed. (London: Graham and Trotman, 1992), p. 134.
- ^{xxxi} These conditions are according to Hanafi school of thought. For further details and comparison, see Mohammad Abdul Halim Umar (1997), pp. 27-28.
- ^{xxxii} S. M. Hasanuzzaman (1992:225).
- ^{xxxiii} Commodity sold in a *salam* contract results in debt burden on the seller and principal received from the buyer becomes a financing vehicle for the seller. Therefore deferring the payment of principal will lead to exchange of debt against debt, which is prohibited. See Mohammad Abdul Halim Umar (1997), p 21.
- ^{xxxiv} Mohammad Abdul Halim Umar (1997), pp. 33-34.
- ^{xxxv} This is based on assumption that one is allowed to combine a *salam* contract with a guarantee. M. Akram Khan makes similar argument in *Commodity Exchanges and Stock Exchange in an Islamic Economy*, p. 315.
- ^{xxxvi} Abdul Halim Ismail 'Deferred Contracts of Exchange in Al-Qur'an,' in *An Introduction to Islamic Finance*, ed. Shaykh Ghazali Shaykh Abod, Syed Omar Syed Agil, and Aidit Haji Ghazali, (Kuala Lumpur: Quill Publishers, 1992), pp. 284-313.
- ^{xxxvii} Another form of *salam* known as *istisna'* can also be considered to emulate a commodity swap. *Istisna'* is a contract according to which the buyer asks a manufacturer to produce something for him against a given price. There is no condition of making full payment at the time of contract. Generally, *istisna'* is applied to a contract of manufacturing something according to a given specification.