

Hussein Kotby

Financial Engineering for Islamic Banks: The Option Approach

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Reviewed by:

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I. Introduction

Financial Engineering refers to "the use of risk management strategies to manipulate the shape of risk profiles one firm is facing" (Kotby 1990, p. 107). Kotby is pioneer in introducing this topic to Islamic bankers and Muslim economists. Since the study was completed in a non-Islamic environment (Japan), the author is credited for presenting (at least some of) principles of Islamic Economics. Such attempts will hopefully bridge the gap in awareness on the part of non-Muslim economists and practitioners.

The author should be also credited for drawing the attention of Muslim economists and bankers to this growing and constantly-changing field. We have to admit that theory and practice of Islamic Economics are, in many aspects, not catching up with contemporary Economics and Finance.

Integrating the above two goals with a careful discussion of the Islamic legality of several financial instruments is expected from a respectable study, and is certainly appreciated.

In the following section I present an overview of the book. Section III sketches the controversy among western writers on financial innovations. Special attention then is given to forwards and options since the author presented financial engineering and trade strategies based on these instruments being permissible. The discussion on this matter spans sections IV and V. Some miscellaneous remarks are given in section VI. Section VII concludes the review.

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II. An Overview

In the first chapter the author reviews evolution and performance of existing Islamic banks. Two important problems facing Islamic banks, according to the author, are: Excess liquidity and diminishing rate of return over time. The author then suggests various financial instruments, with greater emphasis on options, in order for Islamic banks to better manage the excess liquidity. The second chapter discusses the legality of several financial instruments from an Islamic point of view. In this chapter the author argues that options and forward contracts are Islamically permissible. A critical discussion of the author's views in this regard is presented later in this review. However, based on this conclusion the author presents in the third chapter, "for the first time in the literature on Islamic banking, the notion of financial engineering and risk transforming instruments." (p. 193.) In chapter four the author presents a variety of option strategies. Conclusion is given at the end of the book.

III. Financial Innovations: For Better or for Worse?

Do we really need "options", "futures", "swaps", etc.? Do these instruments stimulate growth and development, and help stabilize the economy? Or are they terms that merely mean gambling and non-productive speculation? This is a difficult question, and western, non-Muslim writers, as well as Muslims, have two opposing views. The debate on this matter has been going on for a long time. In 1890, an American Congressman commented on the issue in a congressional meeting saying: (Teweles and Jones 1987, p. 11)

"Those who deal in "options" and "futures" contracts, which is merely gambling, no matter by what less offensive name such transactions be designated, neither add to the supply nor increase the demand for consumption, nor do they accomplish any useful purpose by their calling; but on the contrary, they speculate in fictitious products. The wheat they buy and sell is known as "wind wheat" and doubtless for the reason that it is invisible, intangible, and felt or realized only in the terrible force it exerts in destroying the farming industry of the country."

This passage reflects the position of many other congressmen. There have been several attempts to illegalize futures, for example, in the U.S., all failed except one: in 1958 the Congress passed a bill to prohibit futures trading in onions (*ibid*). Moving to the academic arena, we find that Noble prize winner M. Allais describes Stock Exchanges as "casinos where gigantic games of poker are played" (Allais 1992, p. 37).

On the other side of the debate, we find a notable study that was conducted by the U.S. Congress to examine the "effects on the economy of trading in futures and options" (CAHR 1985). Among its findings, the study reports that "financial futures and options appear to have no measurable negative implications for the formation of capital". These markets "appear to have enhanced liquidity in some of the underlying cash markets on which they are based ...". The study also cited the main arguments that proponents of futures and options present, namely "providing a means by which risks inherent in economic activity ... can be shifted from firms and individuals less willing to bear them to those more willing to do so." (p. 1-2). Financial innovations have their advocates also in the academe. The Noble prize winner M. Miller considers these innovations to be "so successful", since "they have substantially lowered the

cost of carrying out many kinds of financial transactions" (Miller 1992, p. 5). The majority of professionals, in the west, appear to have the same position.

Muslim economists have different views on the issue, although the majority seem to stand against many of these instruments (see e.g. Chapra 1992). The author, H. Kotby, did address the issue from his own point of view. With full respect to the author's views, I review critically his arguments on the subject in the following sections.

IV. Forwards

A forward contract is an exchange in which both price and delivery are deferred to an agreed-upon date. The author rightly considers such transaction as a form of *bay al-kali'*, which Muslim scholars unanimously consider to be illegal (see Hammad 1990). Kotby, following Khan (1988), suggests modifying forward contract by requiring the buyer to have a bank guarantee. This guarantee, according to Kotby, can replace the full price payment. Therefore, the contract becomes a *salam* contract (pp. 59-60). The author then seems to contradict himself when he considers the transaction as "a mere promise to sell rather than an actual sale. Such a promise, in conformity with Islamic law, is not legally enforceable ..." (p. 61). If a bank guarantee does replace the full price payment, then this is an actual (*salam*) sale and is, therefore, legally enforceable. If not, the transaction is illegal since, according to the author, it is a form of *bay al-kali'*.

Some writers, e.g. Al-Darir (1990) and Al-Misri (1991), apparently do not consider deferring price and delivery as a form of *bay al-kali'*. Al-Misri doesn't see any form of *riba* in this transaction. Further, according to Al-Misri, whatever *gharar* involved would not differ significantly from that in a *salam* contract. Why then would deferring price and delivery be illegal?

Let me first clarify that several prominent scholars have explicitly considered deferring price and delivery as a form of *bay al-kali'* (Hammad 1990), and I see no, reason not to agree on that. However, the answer to the question raised by Al-Misri, and to the suggestion made by Kotby to modify the forward contract, requires us to digress on *gharar* for a moment.

On Theory of Gharar

A good and comprehensive exposition of the subject can be found in Al-Darir (1990). There are many definitions of *gharar*. Two of these deserve special attention: (i) By Al-Kasani: "*gharar* is risk in which existence and non-existence are equally likely". (ii) By Al-Ramly: "*gharar* is what involves two possibilities, the more likely of them is the less desirable" (Al-Darir, p. 28,30). The two definitions imply that any transaction with probability of success less than or equal 0.5 involves *gharar*. These definitions point to a simple fact: Not any level of risk is *gharar*. This is made explicit by Ibn Taymiah: "it is well known that Allah and his Messenger did not forbid all kinds of risk" (cited by Al-Misri 1993, p. 35). Risk exists in all economic activities. It is only when risk exceeds a certain level that a transaction is considered illegal. This "significance level" is difficult to quantify, and certainly doesn't have to be 0.5 for all transactions. The concept, however, greatly helps understand why some contracts (e.g. *bay al-kali'*) are prohibited in Islam. This, in turn, facilitates evaluating different kinds of

modifications, like the one suggested by Kotby, before they can be considered legal. To operationalize these concepts, consider the following example.

A Hypothetical Example

Suppose, for the sake of argument, that the minimum acceptable probability by which a transaction can be completed successfully is 65%. If probability of success drops below 65%, the transaction is considered to involve *gharar*, and is therefore illegal. Suppose also that, in a *salam* arrangement, the probability that a seller will deliver a specified commodity on an agreed-upon date is 70%. Then the probability that exchange will be completed is, obviously, 70%, and hence the transaction is acceptable. Next, suppose that the buyer wishes to defer the price in addition to delivery (i.e. have a forward arrangement). Suppose the probability that he will pay the price on the specified date is also 70%. What is the probability that the transaction will be completed? It is $(0.7)^2 = 49\%$. Risk rises exponentially, and the transaction is not acceptable any more. In this example, therefore, the forward contract involves *gharar*, but the *salam* contract doesn't. Now suppose that the buyer provides a bank guarantee, and the probability that the bank will be able to honor the guarantee is also 70%. Then the probability that exchange will take place is $(0.7+0.7-0.49)(0.7) = 63.7\% < 65\%$. Although the guarantee does improve the probability of success, it is still less than the acceptable level. That is, the bank guarantee could not replace full price payment.

Towards an Islamic Theory of Exchange

The above example tells a clear story: The more an economy relies on promises as means of payment, the less it is likely that these promises will be honored. This conclusion is well documented and analyzed by two prominent economists: Allais (e.g. 1992, 1987) and Minsky (e.g. 1982). They show how the economy becomes increasingly unstable, with ever rising inflation rates, as promises become the dominant form of payment. With this concept clear in mind, it is striking how phrases of the Prophet (peace be upon him) and rules of the *Shari'ah* addressed this issue more than 1400 years ago. Consider the following rules (see e.g. Al-Darir 1990) :

1. A trader is not allowed to Sell what he doesn't have.
2. A trader is not allowed to sell a commodity unless he possesses it.
3. Bay al-kali' is illegal.

The common factor between these prohibited transactions is that they rely critically on promises. Hence, we can recognize a valuable principle behind these rules: *Minimizing the dependency of exchange on promises*. This conclusion is strengthened when we know that the Prophet (peace be upon him) used to seek refuge from *al-maghrim* (Bukhari). According to ibn Hajar, *al-maghrim* is "what one is obliged to discharge, like debt." (1988, 11:181). This interpretation clearly includes all types of promises to pay or deliver in a future date. But that doesn't imply necessarily that any contract with a future commitment is illegal. In fact, we know that the Prophet did allow *salam* and bay *al-ajel*. Commitments provide a secure environment for economic activities, and there is nothing objectionable, in principle, about that. But when commitments are too risky and therefore become mere promises, fragility, instability, and inflation start to dominate whatever positive aspects are associated with such promises. Although *Shari'ah* sets the rules by which productive commitments can be

distinguished from risky promises, it's a real challenge to Muslim economists today to uncover these rules in order to be able to apply them to contemporary financial transactions.

A trader who sells what he doesn't have or possess is, in effect, promising to sell. Given the short horizon of the contract (which distinguishes it from *salam*, see Al-Darir 1990), the risk involved is too high to tolerate.

The same principle explains why a *salam* contract is legal while a forward is not. In the former, a unilateral commitment is involved, and benefits from the contract usually exceed the risk of default by the committed party. In the latter, there is nothing but promises, and both parties are vulnerable to risk of default. Although there might exist some benefits from such an arrangement, these benefits, from the *Shari'ah* point of view (as evidenced by the *ijma'* on forbidding *bay al-kali'*), are outweighed by the risk involved. The level of such risk apparently reaches the threshold of *gharar*, and therefore cannot be tolerated. The same principle can also explain why a bank guarantee cannot replace full price payment. Adding another promise to a transaction consisting merely of promises doesn't make any essential difference.

In my opinion, prohibition of *bay al-kali'* is not an isolated rule. Rather, it is an element of a coherent theory that sharply distinguishes Islamic Economics from Capitalism. Without a theory that can consistently explain the structure behind these *Shari'ah* rules, they would appear at a first sight scattered and unrelated, and can be therefore easily dismissed one after one.

Conclusion on Forwards

Forward dealing is a form of *bay al-kali'*. Muslim scholars unanimously consider this kind of transactions to be illegal. I disagree with the author's opinion that a bank guarantee can replace full price payment. Forbidding *bay al-kali'* is an element of a general principle of Islamic regulations of exchange: To minimize the dependency of exchange on promises. There is certainly much work needed on this topic. But one can safely conclude that Islamic regulations of exchange, if followed, should lead to a considerably stable, yet productive, economy.

V. Are Options Legal?

An option on a certain asset is either the right to buy the asset (a call option), or the right to sell the asset (a put option) at a predetermined price and within some predetermined time period (Bittman 1990).

The author advocates the legality of options. The argument he presents is that option contract is a form of *bay al-khiyar*, a legal contract in Islam (pp. 91-98). I disagree with the author on this matter, since there is an important difference between the two: In an option contract there is a premium paid by the option holder for the privilege of having the right to buy or sell a certain asset. This premium does not exist in *bay al-khiyar*.

A better approach to options is to consider *bay al-urboon*. In this contract, the buyer of a certain good would pay a certain amount of money upfront. If he wants to keep the good, this amount would apply to the price, otherwise it belongs to the seller (Ibn Qudama, 4:257).

Muslim scholars have different views on *bay' al-urboon*. Umar and his son, Abdullah (may Allah be pleased with him), Ibn Seireen, and Imam Ahmad consider it legal. Ibn Abbas (may Allah be pleased with him) al-Hasan, al-Shafiee, and Abu Haniefah consider it illegal. There is no definite authentic statement from the Prophet (peace be upon him) on this issue (see Ibn Abi Shaiba, 7:304-307 where he narrates an authentic but mursal hadith that permits *al-urboon*, (Ibn Qudama op. cit., Kandahlawy 1980, 11:45). Minor modifications of both the option contract (make the premium part of the security price) and of *bay al-urboon* (define a certain term, or *ajal*) would make the two identical. But is this sufficient to make options legal?

From the practice of investors, we know that one would buy an option (call option) almost solely to monitor the price of the underlying security. If the security price rises sufficiently, he would exercise the option, otherwise he would lose the premium. The transaction as a whole, therefore, looks like "betting on the expected performance of the corporation in very much the same way gamblers bet on horses in horse racing" (R. Zaman 1986, p. 137). This argument is still valid even after the modification explained above. Kotby's response to this objection was not to the point. He focused on defending the principle of speculation, and how it can be useful for free markets (pp. 93-94). Even if we agree on that, the above objection is still valid. It might be legal to speculate on horses prices, but this does not imply that we are allowed to bet on their performance. A better response is to say that nothing in the (modified) option contract specifies why would the option holder exercise the option. So, technically speaking, the (modified) contract, if we accept *bay al-urboon*, is legal. Investors, however, may use it for an objectionable purpose. But this is not sufficient to judge that the contract in itself is illegal.

An opponent of options would reply: "But is it wise to judge the contract independent of its use?" An options proponent would respond: "Options are used to hedge against risk inherent in the economy. This type of risk is completely different from the one associated with gambling. The latter is artificial and gamblers are able to avoid it completely. This is not the case for the economic risk. So, even if traders in options (or other instruments) appear to behave the same way gamblers do, the circumstances are different."

Risk is probably not the only factor to consider. An important factor is the structure of payoffs of the two traders.

Conflict of Interest and Zero-Sum Games

Risk involved in a transaction is one aspect to evaluate the contract accordingly. This has been discussed earlier in this review. Another aspect is the payoff structure of the contract. If the payoff functions for the two parties involved in the contract sum to zero, then this is a zero-sum game (see e.g. Binmore 1992). That is, one party wins exactly what the other loses. This is actually the case for options and futures (and many other contracts like *riba*). In such games, the preferences of the two parties are "diametrically opposed" (*ibid* p. 237). This conflict of interest is only partially appreciated in the western literature on economics and finance. Stiglitz and Weiss (1981) show formally how the interests of a lender and a borrower (in a *riba* contract) are in conflict. Bernanke and Gertler (1989) show how such conflict could lead to business cycles.

Not only such conflict of interests is sub-optimal, it is Islamically undesirable. The Quran frequently emphasizes on keeping relationships between Muslims in peace and harmony. The first reason given by the Quran for prohibiting wine and gambling is: "Satan's plan is but to excite enmity and hatred between you with intoxicants and gambling ..." (Ma'idah, 91). Muslim scholars routinely justify illegality of some contracts by pointing to how it leads to dispute and opposition between the parties involved. So it is not only uncertainty or risk that makes a contract illegal. It is the payoff structure defined by the contract: If the payoffs add to zero, then the two parties are simply opponents to each other. Such position, besides being economically undesirable, as shown by Bernanke and Gertler, is also morally and socially inferior. One can hardly overlook the wisdom of Islam in prohibiting such contracts. I believe that this subject should be given more attention by Muslim economists, as it greatly facilitates the decision of accepting or rejecting many of the new financial instruments.

Conclusion on Options

The option contract, as such, and after minor modification, appears similar to *bay al-urboon*. But if considered in conjunction with its use, it's questionable. The reason is that the outcome, i.e. the price of the underlying asset, is stochastic, and the payoffs for the traders sum to zero. These two features, risky outcome and zero-sum payoffs, characterize all types of gambling. They also provide the right environment for opposing interests of traders. From this angle, one can hardly consider options legal. In my opinion, Kotby's approach to the problem can be greatly improved if the above considerations were taken into account.

VI. Miscellaneous Remarks

1. On p. 58 the author states: "Any transaction that involves payment without exchanging any compensation in return, or *iwad*, is viewed and termed as *riba* or usury which is explicitly prohibited in Islam."

This statement is incorrect for two reasons: (i) This is not the right definition of *riba*. (ii) It is not true that any transaction that involves payment without compensation is prohibited.

It is quite surprising that, despite the large number of studies on the subject, I'm not aware of a clear definition of *riba*. The best "definition" is found in the *hadith* that specifies the six types of commodities exchange in which should be: (a) in equal quantities, and (b) instantaneous. Violation of these conditions is regarded as *riba* (see e.g. Al-Misri 1991 for further details). Attempts to alter this definition do not appear so far successful.

Concerning payments without compensation, it is true that Islam in general encourages exchanges based on productive activities, and discourages non-productive ones. But to use this alone as an operational rule based on which contracts are rejected or accepted is very difficult. For one, compensation doesn't have to be tangible, and therefore cannot be easily measured. Advocates of interest claim that interest is a payment for giving up liquidity and/or abstaining from current consumption. Similar arguments can be raised for other transactions. In addition, the author himself strongly advocates speculation (at least in principle, pp. 93-94). In almost all cases, speculators (in stock markets) earn profits without compensation. Such activities, although discouraged in Islam, cannot be banned altogether. So even if the principle is correct, its application should be consistent with other rules of *Shari'ah*.

2. On page 57 the author states: "Because of interest prohibition in Islam, any form of time premium, either in cash or in kind, is prohibited."

This is another false generality that misrepresents Islamic Economics to non-Muslims. In my opinion, Islam does value time. I refer the reader, for this matter, to the excellent work of Al-Misri (1990, 1991), where he cites Imam Shafiee's statement: "a hundred saa' [of wheat] due on a closer date is higher in value than a hundred saa' due on a farther date" (1991, p. 327). We should be proud of this authentic "theorem" from this respectable Imam, who lived more than 1200 years ago. Recall the discussion in the previous point, that it is preferable to stick to the Prophet's definition of *riba*, rather than attempting, unsuccessfully, to build generalizations that are neither inclusive nor exclusive.

3. Kotby discussed several other transactions, like futures and swaps. He provides a well-structured discussion of their nature and permissibility. Unfortunately, because of time and space constraints, I will only summarize these views without any further discussion. The author advocates the non-permissibility of both futures and swap contracts. Following Attiah (1986), however, the author suggests adopting an "Islamic swap" or *almurajaha al-Islamiah* (p. 83). Interested readers are referred to Kotby's work.

VII. Conclusions

Financial engineering is an important tool in modern complex and risky business world. As Kotby rightly notes, since Islamic banks are by construction risk takers, they should be concerned with risk management more than other institutions do. The author is pioneer in drawing the attention of Muslim bankers to the importance of this field. He should be also credited for suggesting a variety of options strategies for Muslim investors.

But it is very crucial, I believe, that one builds on a solid and sound Islamic ground before going too far. The author builds his work on permissibility of forward and option contracts. As discussed above, there are strong reasons to be skeptic about that. There are two directions in which the author can greatly improve his work: (i) In-depth discussion of permissibility of forwards and options, and (ii) searching for new financial instruments that conform to agreed-upon Islamic regulations.

Overall, Kotby's work is a valuable source for Muslim economists and financial analysts. It is therefore a welcome contribution to Islamic Economics library.

References

- Al-Darir, M. (1990)**, *Al-Gharar wa Atharuhu fi al-Uqood*, Dar Al-Jeel. (Arabic)
Al-Misri, M. (1990), *Bay Attaqsceet*, Damascus, Dar Al-Qalam. (Arabic)
 ----- **(1991)**, *Al-Jami' fi Usool Arriba*, Damsscus, Dar Al-Qalam, (Arabic).
 ----- **(1993)**, *Al-Maysir wal Qimar*, Damascus, Dar Al-Qalam, (Arabic).
Allais, M. (1987), "The Credit Mechanism and its Implications," *in: Feiwel, G., (editor), Arrow and the Theory of Economic Policy*, New York University Press, pp. 491-561.
 ----- **(1992)**, "The Monetary Conditions of an Economy of Markets," unpublished paper, Jeddah, Islamic Development Bank.

- Attiah, G. (1986)**, *Al-Bonook al-Islamiyah bayn al-Hurriah wa al-Tanzim*, Ria'satul Mahakim al-Shariyah, Qatar. (Arabic)
- Bernanke, B., and Gertler, M. (1989)**, "Agency Costs, Net Worth, and Business Fluctuations," *American Economic Review*, March, pp. 14-31.
- Binmore, K. (1992)**, *Fun and Games A Text on Game Theory*, D. C. Heath Company.
- Bittman, J. (1990)**, "Fundamentals on Options," in: **The Option Institute, (editor)**, *Options Essential Concepts and Trading Strategies*, Business One Irwin, pp. 29-67.
- CAHR (1985)**, (Committee on Agriculture, House of Representatives), *A Study on the Economy of Trading in Futures and Options*, U.S. Government Office.
- Chapra, U. (1992)**, "Comment on M. M. Metwally's 'The Role of the Stock Exchange in an Islamic Economy,'" in: **Abod S., Agil, S., and Ghazali, A., (editors)**, *An Introduction to Islamic Finance*, Kuala Lumpur, Quill Publishers, pp. 353-361.
- Hammad, N. (1990)**, *Dirasat fi Usool al Mudnynat*, Dar Al-Farooq. (Arabic)
- Ibn abi Shaiba, A., Al-Kitab AI-Musannaf.** (Arabic)
- Ibn Hajar, A. (1988)**, *Fathul Bari Bisharh Sahih Al-Bukhari*, Dar Arrayan, second edition. (Arabic)
- Ibn Qudama, A., Al-Mughni**, Alam Al-Kutub. (Arabic)
- Kandahlawi, M. (1980)**, *Awjazul Masalik ila Muwatta' al-Imam Malik*, Dar Al-Fikr. (Arabic)
- Khan, M. A. (1988)**, "Commodity Exchange and Stock Exchange in Islamic Economy," *The American Journal of Islamic Social Science*, reprinted in: **Abod S., Agil, S., and Ghazali, (editors)**, *An Introduction to Islamic Finance*, Kuala Lumpur, Quill Publishers, 1992, pp. 314-340.
- Kotby, H. (1990)**, *Financial Engineering for Islamic Banks*, Institute of Middle Eastern Studies, Japan.
- Miller, M. (1992)**, "Financial Innovation: Achievements and Prospects," *Journal of Financial Engineering*, Vol. 1, No. 1, pp. 1-13.
- Minsky, H. (1982)**, *Can "it" Happen Again?*, M. E. Sharpe.
- Teweles, R and Jones, F. (1987)**, *The Futures Game: Who Wins? Who Loses? Why?* 2nd ed. New York, McGraw Hill.
- Stiglitz, J., and Weiss, A. (1981)**, "Credit Rationing in Markets with Imperfect Information," *American Economic Review*, June, pp. 393-410.
- Zaman, R. (1986)**, "The Operation of the Modern Financial Markets for Stocks and Bonds," *The American Journal of Islamic Social Science*, reprinted in: **Abod S., Agil, S., and Ghazali, A., (editors)**, *An Introduction to Islamic Finance*, Kuala Lumpur, Quill Publishers, 1992, pp. 362-378.