

OPTIONS AND THEIR USES IN PARTICIPATION BANKS

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İSTANBUL BİLGİ ÜNİVERSİTESİ  
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OPTIONS AND THEIR USES IN PARTICIPATION BANKS  
OPSİYONLAR VE KATILIM BANKALARINDAKİ YERİ

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- 4) Derivative Instruments
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## **ABSTRACT**

This thesis assesses the general aspects of Financial Options and their uses in Participation Banking (Islamic Finance). First referring to the characteristics and specifics of modern options and briefly mentioning the pricing methods, paper then will get into the matter of exotic options especially which would be comparable with the ones in Participation Banking. Considering the rapid growth of Participation Banking in the world we will discuss the needs of options in Islamic Banking and show some cases in which options are used in strategies that have very similar aspects to some conventional exotic options. Finding few differences, we will compare the uses of options in Conventional Banking and Participation Banking.

## ÖZET

Bu tez Finansal Opsiyonların genel özelliklerini ve Katılım Bankalarındaki yerini ele almaktadır. Öncelikle modern opsiyonların özelliklerini işleyip kısaca fiyatlama metodlarına değinilecek ve sonrasında özellikle Katılım Bankacılığındaki örneklerle benzerlik gösteren egzotik opsiyonlardan bahsedilecektir. Katılım Bankacılığının Dünya çapındaki hızlı yükselişi göz önüne alınarak İslami Bankacılığın opsiyon ürünlerine olan ihtiyacına dikkat çekilecek ve Konvansiyonel Bankacılıktaki egzotik opsiyon karşılıklarıyla yüksek benzerlik gösteren vakalar işlenecektir. Farklılıkları az olan bu vakalar üzerinden opsiyonların Konvansiyonel Bankacılık ve İslami Bankacılıktaki yerleri kıyaslanacaktır.

## TABLE OF CONTENTS

LIST OF FIGURES .....	VIII
LIST OF TABLES .....	IX
LIST OF EXHIBITS.....	X
LIST OF CHARTS .....	XI
1. INTRODUCTION .....	1
2. LITERATURE REVIEW .....	2
3. DEFINITON, CHARACTERISTICS AND HISTORY OF OPTIONS.....	4
3.1. Derivatives and Associated Risks .....	4
3.2. Considerations in Context .....	5
3.3. Definition of Financial Options .....	6
3.4. The Emergence of Global Options Market .....	7
3.5. Types of Options .....	9
3.5.1. Call Option .....	9
3.5.1.1. Buying Call Options .....	9
3.5.1.2. Selling Call Options.....	10
3.5.2. Put Options .....	14
3.5.2.1. Buying Put Options .....	14
3.5.2.2. Selling Put Options .....	16
4. OPTIONS IN CONVENTIONAL BANKING .....	18
4.1. Mechanics of the Buying and Selling Options.....	18

4.1.1. Commission Charges.....	18
4.1.2. Financial Leverage .....	19
4.1.3. Factors Affecting the Choice of an Option .....	20
4.1.3.1. Length of Term of the Option.....	20
4.1.3.2. Exercise Price of Option.....	20
4.1.4. After the Purchase of Options .....	22
4.1.4.1. Settling the Option.....	22
4.1.4.2. Keeping the Option.....	24
4.1.4.3. Exercising the Option .....	24
4.1.5. Endorsement of the Option and the Reasons.....	25
4.2. Styles of Options .....	27
4.2.1. European Style of Options .....	27
4.2.2. American Style of Options .....	27
4.3. Exotic Options.....	28
4.3.1. Barrier Options .....	28
4.3.2. Asian Option (Average Option) .....	31
4.4. Risks of Options.....	33
4.5. Pricing Options .....	34
4.5.1. Greeks.....	35
4.5.1.1. Delta (d):.....	35
4.5.1.2. Gamma (c):.....	36
4.5.1.3. Theta (q): .....	37
4.5.1.4. Vega (n):.....	37
4.5.2. Simple Binomial Approach.....	37

4.5.3. Black & Scholes Model.....	41
5. OPTIONS IN PARTICIPATION BANKING.....	45
5.1. Global Position of Participation Banking .....	45
5.2. Characteristics of Participation Banking.....	49
5.2.1. Principles of Participation Banking.....	51
5.3. Evaluation of Options in Participation Banking .....	53
5.4. The Applications and Uses of Options in Islamic Banking .....	55
5.4.1. Al-Khiyar.....	55
5.4.1.1. Khiyar Al-shart on Leasing Contracts .....	58
5.4.1.2. Khiyar Al-shart on Utilization.....	59
5.4.1.3. Khiyar Al-shart on Stock Market .....	60
5.4.1.4. Khiyar Al-shart on Procurement.....	61
5.4.1.5. Valuation of Khiyar al-Shart .....	65
5.4.2. ‘Urbun (Down-Payment Sale).....	71
5.4.2.1. ‘Urbun as a Call Option.....	71
5.4.2.2. Case Study 1 on ‘Urbun: <i>Al-Ahli</i> International Secured Fund .....	72
5.4.2.3. Case Study 2 on ‘ <i>Urbun: Al-Rajhi Aman</i> Fund.....	75
5.4.3. The Use of Options in Kuveyt Turk Participation Bank.....	77
5.4.3.1. Protected Participation Account .....	78
5.4.3.2. Profitable Participation Account.....	80
6. CONCLUSION.....	84
REFERENCES .....	86

## LIST OF FIGURES

Figure 1: Profit and Loss from Long Call Options .....	10
Figure 2: Profit and Loss from Short Call Options.....	13
Figure 3: Profit and Loss from Long Put Options .....	15
Figure 4: Profit and Loss from Short Put Options .....	17
Figure 5: Binomial Expression of Option Price and Cash Relationship.....	39
Figure 6: Yields for an Option of Single Period Purchase.....	39



## LIST OF TABLES

Table 1: Call Payoffs in Barrier Options .....	30
Table 2: Put Payoffs in Barrier Options.....	30
Table 3: Premium / Profit Ratios in KT's DCDs.....	80
Table 4: Option Types for the According Deposit Accounts .....	81

## **LIST OF EXHIBITS**

Exhibit 1: Price Fixation under Istijrar .....	64
Exhibit 2: Al-Ahli Secured Fund Returns.....	74
Exhibit 3: Al-Rajhi’s Aman-1 Fund .....	76

## LIST OF CHARTS

Chart 1: Growth Rate Banking Assets by Segment .....	46
Chart 2: The Growing Importance of Islamic Banking Activities of Conventional Banks .....	47

## 1. INTRODUCTION

Solution is a phenomenon which people need in their everyday life. A “u” type pipe is a solution in infrastructure, trading goods was a solution to have something that you need in exchange for another and in this sense, money is a solution which helps people to have goods and services without having to pay with goods or services with equal value. “Option” also is a solution when people find themselves in certain conditions and needs. Obviously the first condition is to be in need of an option is “uncertainty” or “volatility”. People need to have an option when they do not know what will certainly happen in the time when they make a transaction.

Although we all know that the options’ fundamentals were established in modern world and in the western “developed” countries, we are wrong and right at the same time. We are right that today’s option contracts and speculative uses of options are indeed founded in modern world but first option were seen in ancient history.

In this paper we will discuss how options have come to being, why they were needed in the first place and their uses in the history and eventually in the modern world. After discussing the specifics and generally briefing the options we will discuss how options are used in Participation Banking and we will see how option-like contracts are used in Islamic Finance.

Comparing these two, somewhat distinct, financial “schools”, we will try to indicate what makes them different or alike on the matter of Option Contracts by pointing out the theoretical and practical differences and/or similarities. As a newly establishing aspect in the Participation Banking, we will try to understand the Islamic Options and their feasibility as a commonly used Islamic financial instrument. We will try to illuminate the way that Participation Banking would take if it is to compete in the arena of Financial Options.

## 2. LITERATURE REVIEW

We have benefited from various resources about conventional options, option strategies, exotic options and option pricing. Although this part generally explains the option dynamics we have sometimes get into the details and try to convey the essence from Black & Scholes, 1973.

For general comprehension of the topic, Nurgül Chambers' "Türev Piyasalar", Okan Aybar's "Vadeli İşlemler Piyasalarına Giriş" and various other books and internet sources are used in order to have a comprehensive view about the topic.

On the other hand, for the topic of Options in Islamic Finance which many scholars have different opinions on its permissibility with different reasoning for approving and prohibiting such contracts, we try to convey these different opinions unbiased and reveal the cases and uses of options objectively.

Obiyatullah Ismath Bacha's extensive review in 1999 helped us in this topic explaining "*the evolution of modern financial derivatives, the financial instruments from Shari'a perspective, some of the Islamic instruments that are the same as derivatives and the objection of Islamic scholars regarding derivatives that might need some rethinking and evaluation*". (Nuradli Ridzwan Shah Mohd Dali, Sanep, Ahmad, A Review of Forward, Futures, and Options From The Shariah Perspective. "From Complexity to Simplicity")

We also benefitted from the objections of Mohammed Obaidullah about Obiyatullah's opinions. While Obaidullah objects options, Ali Salehabadi and Mohamad Aram's work helped us to show the pro side of this argument.

Mahmoud A. El-Gamal's extensive work on Islamic Banking, gave us the cases that we compared and contrast these embedded options with their conventional counterparts that are Barrier and Asian option which are both considered as exotic options.

All in all, in this thesis we will see the descriptions and uses of options and option-like contracts in western countries and Islamic Finance and compare them in the process.

### **3. DEFINITION, CHARACTERISTICS AND HISTORY OF OPTIONS**

#### **3.1 Derivatives and Associated Risks**

Securities as financial instruments are certificates or book-entries (as mostly used today) that represents financial value. These may be debt securities (bonds, banknotes etc.), equity securities (e.g. common stocks) and derivatives (i.e. options, forwards etc.). They are available to the public, sold in a form and in standard units. Our concern among these securities is option contracts which are one of the many derivatives.

Derivatives are financial instruments whose price is derived from that of an underlying: asset (stocks, bonds, precious metals and other raw materials), reference rate (exchange rate, interest rates, indices), conducting an event (credit event, natural disaster).

Securities transactions, particularly derivatives, involve financial risk. Options, which may consist of several financial instruments, the instruments are sometimes difficult to grasp. This is particularly the case of options called "exotic". This thesis tries to illuminate some of these financial instruments as well as their counterparts in the Islamic Finance. However it cannot replace the product descriptions published by issuers and securities dealers. Your financial advisor (generally your bank) is at your disposal for any further information.

Basically, it is necessary to distinguish the risky financial instruments and financial instruments limited to unlimited risk. When you buy shares or options, you take a limited risk. At worst, you lose the capital invested and will not realize capital gains.

Certain derivatives may cause you to have to inject funds beyond the amount of your investment. This obligation to meet margin calls can be several times the purchase price of your securities. Among the unlimited risk operations include in particular:

- The sale of a call option without hedging
- The sale of a put option or
- Forward transactions.

### **3.2 Considerations in Context**

It takes a certain kind of framework for the underlying markets for the international derivatives are effective and complete. They essentially require the underlying markets and frictionless posing, no restrictions on taking positions on the purchase or sale, and a harmonious integration between different compartments provided by the voluntary participation of all agents. To put it simply, the effectiveness of international derivatives is not compatible with the existence of controls on the underlying market.

This is a fundamental challenge faced by authorities in economies where macroeconomic and structural constraints as well as financial stability considerations require the existence of certain restrictions on the underlying markets. The existence of an underlying exposure continues to be an imperative to conduct transactions on the derivatives exchange. More important, the tolerance of the real sector in respect of high volatility in exchange rates and interest rates is limited the actions of authorities on the spot markets represent another variable to consider.

While the international derivatives do not fit within this framework, regardless of their advantages of an operational standpoint, the instruments in OTC (over the counter) can continue to develop markets in a gradual manner, taking into account the constraints existing.



### **3.3 Definition of Financial Options**

One option is a contract which entitles its holder to buy or sell an asset at a specified price during a date already established and these are incorporated trading rights.

In other words is a contract between A (buyer) and B (seller) where A acquires the right to buy (call option) or sell (put option) an asset, and B acquires the obligation to buy (put option) or sell (call option) an asset for a specified price during a period or at a specified date, upon payment of a premium to the buyer to assume the risk in trading.

In an option contract, rights and obligations of the buyer and seller lack of symmetry and the buyer is entitled to exercise the option in a period corresponding to the same. However the seller has the obligation in the sense that they have to sell or buy if the holder of the option chooses to exercise and otherwise does nothing. The buyers exercise the options when the changing underlying market prices allows them to reap the benefits and options of these utilities, predict losses for the sellers so the risk is assumed by both parties.

Financial options are a group of financial products called "financial derivatives", name given because their behavior is derived from its underlying or product to the consignment stocks, foreign currencies, interest rates, etc.

These financial products resemble those insurance policies in which someone is willing to pay a certain amount of money (premium) to cover the eventuality that the occurrence of an accident, which is the market risks, in this case.

### **3.4 The Emergence of Global Options Market**

Man has been trading commodities for thousands of years and financial instruments for more than hundred years. The ancient pre runners of today's trading floors - the agoras of ancient Greece, the forums of the Roman Empire and the medieval fairs of Western Europe - established basic principles of trading, those, are still important today.

That's why the history of options on tangible commodities is a long one. There is evidence of the use of option related contracts in the ancient world, and among the medieval banks and financial institutions of Italy, Germany and other financial centers. Options on individual stocks were traded on semi-organized exchanges in Holland and the United Kingdom as early as the 17th century. For the reason of the lack of an adequately organized exchange on which trading could take place, and adequate clearing and regulatory systems to ensure the maintenance of an orderly market, and the efficient fulfillment of the option contracts, the history of options trading has been characterized by scandals, defaults, and other criminal activities.

In 1973, a revolutionary step was taken for the options world. The solution for the three above mentioned problem was found by the commencement of stock option trading on the Chicago Board Options Exchange (CBOE), and founding of the Options Clearing Corporation to guarantee performance on all stock options contracts traded on US stock exchanges. The exchange began modestly, with trading only in call options on sixteen common stocks, but it soon became a tremendous success.

This success subsequently led to a vast expansion of option trading in the United States, both on additional exchanges such as the American Stock Exchange (AMEX), the Philadelphia Stock Exchange (PHLK), the Chicago Board of Trade (CBOT) and the Chicago Mercantile Exchange (CME), and on many different underlying assets such as currencies, stock indices, and

treasury bonds. Exchange traded options markets also developed in Amsterdam, London, Sydney and Toronto.

Some outstanding developments innovated after the establishment of organized option exchanges are;

- a) The creation of a central market, place with regulatory surveillance, disclosure, and price dissemination capabilities,
- b) The standardization of expiration dates and the standardization of exercise prices has provide more liquid market,
- c) The creation of a secondary market, so that there is no obligation for holders of options imposing them holding their options until the expiration date. In practice, the majority of option buyers, sell their options on the exchange either for a profit, or reduce the loss,
- d) The introduction of a Clearing Corporation as the guarantor of every option. Standing as the opposite party for every trade, the Clearing Corporation enables buyers and sellers of options to close their positions in the market at any time by making an offsetting transaction,
- e) The transaction cost of options quoted in exchange list is lower than cost faced in conventional OTC (over the counter) markets. It is seen that this fact has got positive effect on transaction volume,
- f) Options Clearing Corporation does not issue certificates. This has been the end of the physical shipment and no doubt has brought efficiency and reduced the costs also.

## **3.5 Types of Options**

### **3.5.1 Call Option**

A call option is a contract giving its owner the right to buy a fixed number of shares of a specified common stock or a good at a fixed price at any time on or before a given date. Let us examine the profit and loss profile for buying and selling call option.

#### **3.5.1.1 Buying Call Options**

The purchase of a call option remained the most popular strategy for investors since the existence of options. This strategy allows an investor to benefit from high leverage and a low initial investment. The investor expects the return on long call position (buying call option) is on a rise in the price of underlying asset. Experience and precision are the main components to choose the right option to have the most beneficial result.

We may also use options as a substitute for action. An investor may buy call options instead of shares it wants to integrate its protection. He buys a call option, while spending less money than if it buys an equivalent amount of shares. It is useful to remember that option contract equals 100 shares of underlying. Keeping a call option, the investor retains the right to buy 100 shares of the action he has selected at any time predetermined strike price until the contract expires.

Let us illustrate the statement by real numbers. ABC's shares are traded on January 15 to \$ 50.

Investors who think that their price will go up in the very near future buy 5 call options ABC in March 1955 to \$ 1 per option. If he had bought the securities, he reportedly paid \$ 50 x 500 shares = \$ 25,000. Cost of operation with options = \$ 500 (5 calls x 100 x \$ 1 shares), representing an

investment 50 times smaller than the investment it would have done with the same actions.

Note: The option holders do not have the same rights as shareholders. No voting rights or dividends. If you have a call option, you must exercise the option and hold the securities to have those rights.

Advantage: Less committed capital, high leverage, percentage of high return, risk predetermined.

Maximum Profit: Unlimited

Maximum Loss: Limited (Net premium paid)

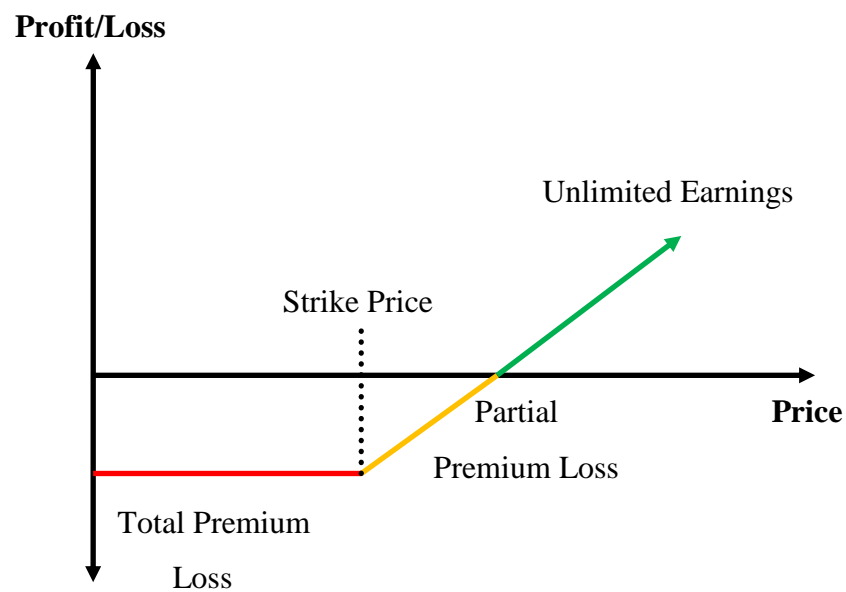


Figure 1: Profit and Loss from Long Call Options

### 3.5.1.2 Selling Call Options

The seller of a call option, by the nature of her/his contract, is obliged to sell an equivalent number of shares at an exercise price of the call option if it is assigned to the contract issued. The sale of a call option may be a way to short sell shares at a price above the market price. Many investors emit call options because they are willing to take short positions in exchange of the

premium received from writing call options. It depends on their expectations from underlying assets prices in the market and it also depends on their risk perceptions. Some investors prefer to sell call options rather than to place sell orders at a limit price above the current market and expect prices to rise. This strategy is slightly neutral to bearish.

Short Call (Selling Call Options); this strategy allows the investor to sell shares at a net price above the current market while increasing portfolio returns because of the premium received. Before you sell call options, the investor must be able to sell the relevant securities if the buyer decides to exercise the options. Thus, it "guarantees" his call options or by a cash deposit or by the amount of short selling the actions.

The number of contracts of call options issued should match the number of shares that the investor is able to sell. This strategy can become speculative when more call options are issued than the equivalent number of shares possessed. It is useful to remember that option contract equals 100 shares of the underlying asset.

The issuers of the call option harvest the bounty of the sale, regardless of the ups and downs of the stock price. However, if the option is exercised by the buyer they are then obliged to sell an equivalent amount of shares at an exercise price of the call option issued.

The premium received from the sale will partially offset the cost of selling shares and may result in the sale of shares above the market price. If the stock rises significantly and the option is exercised, the sale price of securities may be below market prices and issuer of the call option may have an unrealized loss due to high price sale of securities.

As a call writer, investor obligates himself to sell, at the strike price, the underlying shares of stock upon being assigned an exercise notice. For

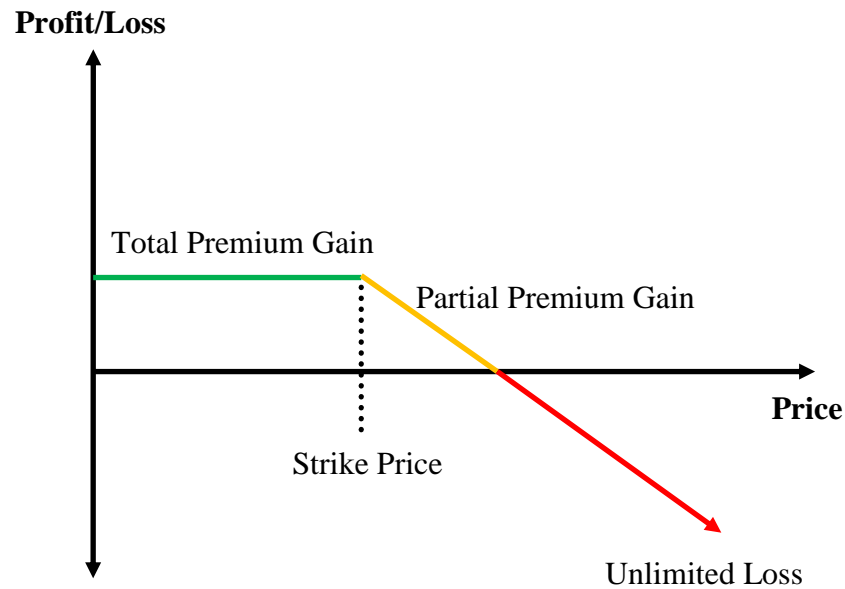
assuming this obligation, investor is paid a premium at the time he sells the call. The most common way is writing calls against a long position in the underlying stock, referred to as covered call writing. Investors write covered call options primarily for the following reasons:

- 1) to realize additional return on their underlying stock by earning premium income,
- 2) to gain some protection (limited to the amount of the premium) from a decline in the stock price.

A covered call option writer's potential profits and losses are influenced by the strike price of the call he chooses to sell. In all cases, the writer's maximum net gain will be realized if the stock price is at or above the strike price of the option at expiration (maturity) or at assignment (exercise).

Assuming the stock purchase price is equal to the stock's current prices;

- a) If he writes an at-the-money call (strike price equal to the current price of the long stock), his maximum net gain is the premium he receives for selling the option,
- b) If he writes an in-the-money call (strike price less than the current price of the long stock), his maximum net gain is the premium minus the difference between the stock purchase price and the strike price,
- c) If he writes an out-of-the-money call (strike price greater than the current price of the stock), his maximum net gain is the premium plus the difference between the strike price and the stock purchase price.



*Figure 2: Profit and Loss from Short Call Options*

If the call option expires worthless, the profit is limited to the premium received from the initial sale. If stock prices go above the call option strike price, the investor could be assigned (the option could be exercised) and have to sell an equivalent number of securities. The net selling price of the shares would be the exercise price of the call option less the premium received from the sale. This price may be higher than the market price.

The potential loss for this strategy is similar to owning an equivalent number of securities, so after assigning, the loss would be the difference between the sale price of securities and the exercise price of the call option. Theoretically, stock prices can fall to zero. The profit comes in the case from a dead or breakeven calculated as follows:

$$\text{Strike} + \text{Premium Received} = \text{Neutral}$$

If volatility increases, the options are more expensive. If volatility decreases, the opposite of this happens. Any effect of volatility on the option premium is the portion of the time value of the option. The passage of time has a positive effect on the position. Part of the time value of option premium generally decreases or eroded over time. This decline is accelerating gradually as the option contract approaches expiration. It is



important to note that an issuer of a call option can be redeemed at any time to close your market position. This can be done by realizing a gain or a loss by cutting.

### **3.5.2 Put Options**

#### **3.5.2.1 Buying Put Options**

The purchase of put option is made by an investor who wants to take advantage of lower prices of the underlying. This strategy allows an investor to benefit from high leverage and low initial investment. The return the investor expects his long put (selling put option) position is an increase in the price of the underlying asset. Experience and precision are the main components to choose the right option to have the most beneficial result.

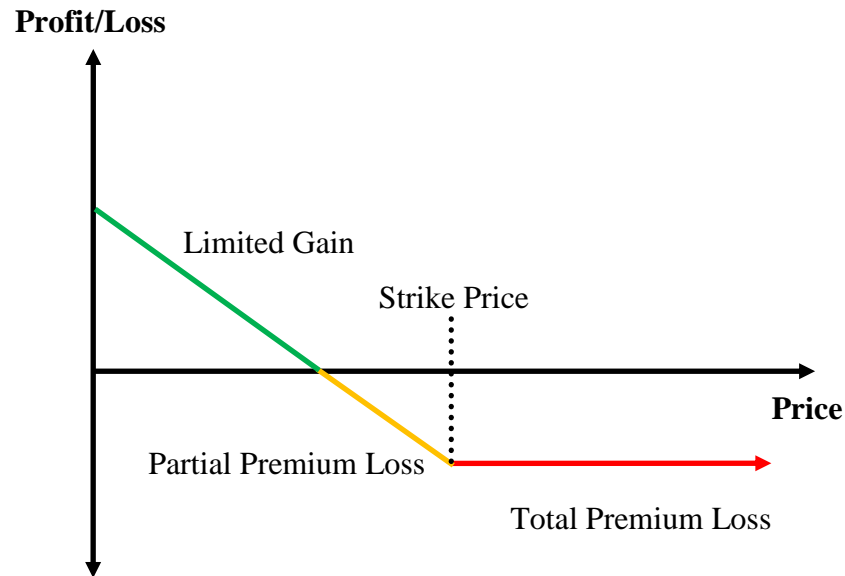
We may also use options as a substitute for action. An investor can buy put options instead of short selling the shares. He buys a put option by investing less money than if he sells an equivalent amount of shares. It is useful to remember that option contract equals 100 shares of underlying. Keeping the put option, the investor retains the right to sell 100 shares at any time at a predetermined strike price until the contract expires.

Let us make an exercise of the fact in order to understand better. ABC's shares are traded on January 15 to \$ 50. Investors who think that their price will fall in the very near future buys 5 puts ABC in March 1945 to \$ 1 per option. If he had sold the securities, he reportedly paid \$ 50 x 500 shares = \$ 25,000. Cost of operation = \$ 500 (5 x 100 shares x puts \$ 1), representing an investment 50 times smaller than the investment they have made with the same actions.

Advantage: Less committed capital, high leverage, percentage of high return, risk predetermined.

Maximum Profit: Limited if the stock drops to zero

Maximum Loss: Limited (Net premium paid)



*Figure 3: Profit and Loss from Long Put Options*

The profit comes in this case from a dead or breakeven calculated as follows:

$$\text{Exercise Price} - \text{Premium Paid} = \text{Neutral}$$

Your maximum profit depends only on the potential price decline in the value, in theory the profit is limited because the action can drop to zero. At the end, put option in the money (ITM = In the Money) generally will be worth its intrinsic value. Although the potential loss is predetermined and limited, it cannot exceed the premium paid for the purchase of the put option.

If volatility increases, the options are more expensive, so it's good for the buyer to put option. If volatility decreases, the opposite will happen. Any effect of volatility on the option premium is the portion of the time value. The passage of time has a negative effect on the position.

Part of the time value of option premium generally decreases or eroded over time. This decline is accelerating gradually as the option contract approaches expiration.

It is important to note that a holder of a put option can sell it at any time to close its market position. This can be done by realizing a gain or a loss by cutting. At expiration, most investors who keep their put option in the money will choose to sell the option contract if it has value. Of course you can also exercise the put option, resulting in the sale of an equivalent number of shares at a predetermined exercise price.

### **3.5.2.2 Selling Put Options**

Selling a put option obligates an investor to buy the underlying shares of stock at the option's strike price upon assignment of an exercise notice. The investor is paid a premium when the put is written to compensate him for assuming this risk.

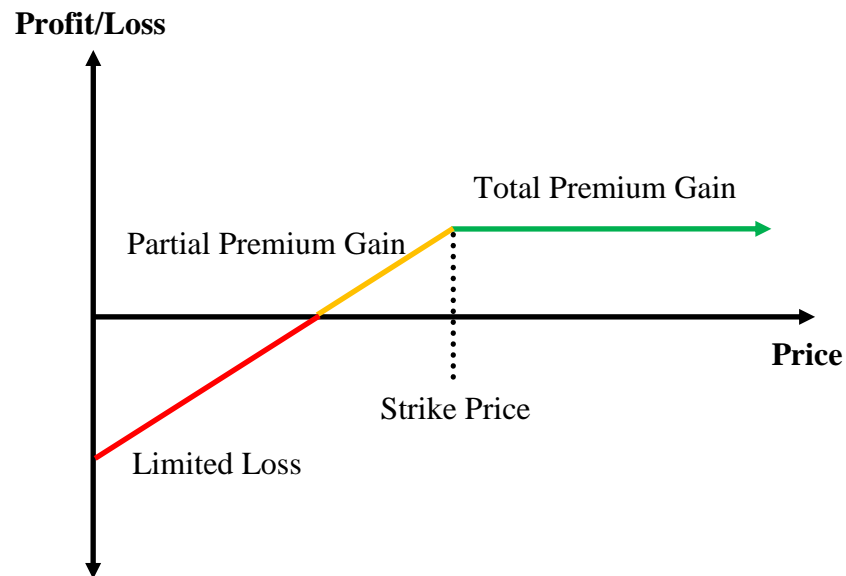
A put writer is considered to be covered if he has a corresponding short stock position. A covered put writer's profit potential is limited to the premium received plus the difference between the strike price of the put and the original share price of the short position. The potential loss on this position, however, is substantial if the price of the stock increases significantly above the original share price of the short position. In this case, the short stock will accrue losses while the offsetting profit on the put sale is limited to the premium received. The covered put writing is not frequently used because uncovered call writing offers the same risk/reward scenario and generally involves less commission cost and higher premiums.

A put writer is considered to be uncovered if he does not have a corresponding short stock position or has not deposited cash equal to the exercise value of the put option. Like uncovered call writing, uncovered put

writing has limited rewards (the premium received) and potentially substantial risk (if prices fall and you are assigned). The primary motivations for most put writers are;

- 1) to receive premium income,
- 2) to acquire stock at a net cost below the current market value.

If the stock price declines below the strike price of the put option and the put option is exercised, writer will be obliged to buy the stock at the strike price. His cost will, of course, offset at least partially by the premium he received for writing the option.



*Figure 4: Profit and Loss from Short Put Options*

## **4. OPTIONS IN CONVENTIONAL BANKING**

### **4.1 Mechanics of the Buying and Selling Options**

#### **4.1.1 Commission Charges**

Before deciding to buy or sell an option, one should understand the implicit costs of commissions and transaction fees.

The commission is the amount of money, per option purchased or subscribed (sold), to be paid to the broker-dealer for its services, including the execution of the order in the Deregulated Market Securities.

The commission fee increases the cost of buying an option and reduces the amount of money received for selling the option. In both cases, the premium and the commission must be indicated separately.

Each company has the power to set their own commission charges, but charges should be expressed so that no confusion will result. To consider negotiating an option, you should be aware of:

1. The fee may be charged per transaction or negotiation complete, which includes the purchase and sale.
2. The commission charges may differ significantly from a brokerage house to another.
3. Some joint committees charged positions (option transaction) and others charge a percentage of the option premium, which generally is subject to a fee.
4. The commission charges are based on a percentage of the premium can be significant, particularly if the option has a high premium.

5. The charge of the committee may have a greater impact on profit opportunities. A high recovery committee reduces the potential gain and potential loss increases.

One must understand fully the issue of charging for the job and how they are calculated. If charges appear to be very high, both based on the dollar as a percentage of the premium of the option, you can compare quotes from one or two positions. If a post justifies the high commission fee based on their performance and curriculum services, you can ask them to give a detailed explanation or written documents.

#### **4.1.2 Financial Leverage**

Another concept that one needs to understand, is the concept of financial leverage, to understand the options fully. The premium paid for an option is only a small percentage of the value of the assets comprising the underlying currency. Therefore, a minor change in the price of the currency may even lead to a utility with a higher percentage or a greater percentage loss in relation to the premium.

Consider the following example:

An operator pays \$ 750.00 for an option to buy 1 Japanese yen option with an exercise price of \$ 0.8200 at the time that the currency price is \$ 0.8200. If, at maturity, the price of the currency has risen to \$ 0.8300 (an increase of almost 1%) the value of the option will increase \$ 1 250.00 (a gain of 66% over initial cost of the transaction of \$ 750 00). However, one should always remember that financial leverage is a double-edged sword.

In the example above, unless the currency price at maturity has been above the exercise price of \$ 0.8200 for the option, the option could expire worthless and the trader would have lost 100 percent of its raw expenses plus fees.

In fact, if the market price of the underlying currency increase, but not exceed the exercise price of the option at expiration, the option would lose all its value. This is a perversely ironic situation in which the trader was in the right direction in relation to the price of money, but still lost money on the option.

#### **4.1.3 Factors Affecting the Choice of an Option**

If you expect an increase in the price, consider buying a call option. If you expect a fall in the price, consider buying a put option. However, in addition to the expectations regarding the price, there are two factors affecting the choice of an option:

- The duration of the term of the option, and
- The exercise price of the option

##### **4.1.3.1 Length of Term of the Option**

One of the attractive features of the options is to allow time for you to meet your expectations. The more time you have, the greater the likelihood that, eventually, the option becomes profitable. This would influence the decision whether to buy, say, an option that expires in March or one that expires in June. Keep in mind that the term of the option (either the expiration of three months or six months) is an important variable affecting the cost of the option. The longer the term of the option the higher the premium would be.

##### **4.1.3.2 Exercise Price of Option**

The relationship between the exercise price of an option and the present price of the underlying currency, with the term of choice is an important factor that affects the option premium. At one point, there may be negotiating with half a dozen options or more of exercise prices, some below the present price of the underlying currency and some above that

price. A call option with an exercise price low have a higher cost premium for a call option with an exercise price higher because you are more likely and suitability to be exercised.

For example, the right to buy the yen to \$ 0.8200 is more valuable than the right to buy the yen to \$ 0.8600. Conversely, a put option with an exercise price higher premium will cost more than one option with an exercise price lower. For example, the right to sell the yen to \$ 0.8400 is more valuable than the right to sell to \$ 0.8200.

While price expectations dictate the decision to opt for an option to purchase or a sale and the decision of the expiration month is taken according to the time they are expected to occur a change of price, price selection exercise is more complex still.

This is the reason that the exercise price will influence not only the cost of the option premium but also the way that is likely to respond the value of the option, once purchased, with subsequent changes in the price of the underlying currency. Specifically, the options that are out-of-the-money usually do not respond to changes in the price of the underlying currency as well as the options that are in a position to-cash or in-cash.

In general, option premiums out-of-the-money does not reflect a relationship based on dollar-dollar, changes in the price of the underlying currency (delta). The change in the value of the option is usually less. In fact, a change in the price of the underlying currency would affect very little or not at all affect the value of the option. This would be the case if, for example, the option is out-of-market after the price change, or if the maturity is near. If you buy an option out-of-the-money, keep in mind that no matter how you move the price of money in your favor, the option will expire worthless and you lose the total amount paid for the premium, unless the option is in-the-money at maturity. For a profit-money should be in an



amount greater than the costs of purchasing the option. This is why it is vital to calculate the equilibrium price of the option before you buy.

Example: In a time when the yen price is \$ 0.8400 and the operator expects to have a substantial increase in the price, buy in March, a call option with an exercise price of \$ 0.9000. At maturity, as expected, there was a significant increase in the price of \$ 0.8800. But, because the option has no value yet to be exercised, expires worthless and the trader loses the entire amount of the premium paid.

#### **4.1.4 After the Purchase of Options**

##### **4.1.4.1 Settling the Option**

The settlement of an option in the same market where one bought is the most common method of making profits of an option (to exercise the option before the due date will result in the loss of time which has been added to the raw option). The settlement of an option before its expiration date by a value which is also still have a way to reduce the loss (by recovering a portion of the amount you paid for the option premium) if the price currency has not behaved as you expected, or changing the perspective of price. In active markets, there are usually other operators who are willing to pay for the rights that you have your choice. How much is it willing to pay? The amount may be more or less what you paid.

That depends on:

- 1) the price of the currency at that time in relation to the exercise price of the option.
- 2) the time that remains for the maturity of the option and
- 3) the volatility of the market.

The gain or loss, after commission costs or other transaction fees, is the difference between the premium you paid to buy the option and the premium you receive from the early settlement of the option.

Example: in anticipation of higher prices of the yen, you buy a call option on yen. The cost of the premium was \$ 950.00 and the commission and transaction costs totaled \$ 150.00.

Yen price rose substantially and now provides a premium option \$ 1,450.00. By the payment of the option at this price, you earn a net profit of \$ 350.00. That is, the sale price of \$ 1 450.00 \$ 950.00 minus the premium paid for the least \$ 150.00 of the commission and transaction costs.

Premium paid for the option.....	- \$ 950.00
Premium received when the option is settled.....	+ \$ 1,450.00
Premium increase.....	= \$ 500.00
Less trading costs.....	- \$ 150.00
Net income.....	= \$ 350.00

However, keep in mind that there is no guarantee that there is actually an active market for that option when you decide you want to liquidate. If the option is removed long before that is suitable to be exercised or if there is little time to expire, there will be any market for that option and any price.

Suppose that, even if there is an active market, the price you get when settled will depend on the option premium at that time. Premiums are established through open competition between buyers and sellers in accordance with the established rules of a deregulated market.

#### **4.1.4.2. Keeping the Option**

The second option you have after buying an option is to retain the right to the last day available for exercise or settlement. This means that if the price change does not happen you'd expect when you thought or even if the price moves initially in the opposite direction, you can continue with the option if it believes the market will correct. If you are wrong, you lost the opportunity to limit losses through liquidation. Moreover, the most you can lose by keeping the option is the sum of the premium and transaction costs. This is the reason why sometimes said that buyers of options have the advantage of staying solid. However, be aware that the value of options falls under the looming deadline.

#### **4.1.4.3 Exercising the Option**

Also, you can exercise the option at any time before the expiration of the option. However, it is important to understand that the exercise of an option on a coin means you will acquire a long or short position in the underlying currencies.

Example: you buy an option on Yen with an exercise price of \$ 0.8400. The price of the currency rose to \$ 0.8600.

If you exercise the option, you would acquire a long position in Yen to \$ 0.8400 with a "paper profit" of \$ 0.0200 (\$ 2,500.00). If the price of the currency continues to go higher, it will also increase your profit.

However, there are significant costs and risks involved in buying a money market position.

First, the broker will acquire a margin deposit to provide protection against possible fluctuations in the price of the currency, on the other hand, if the

currency price moves against your position, will certainly invite him, within hours for you to make additional margin deposits. There are no upper limit purchases to expand these margins.

In general, purchases must be done immediately, which can result in the need of large sums of cash available for fast transfers to your cash account. Second, unlike an option that has limited risk, currency position has unlimited potential. The more the price moves against your position, the greater the loss. Even if you placed an option with the intention to liquidate the position quickly gained currency through the placement, there is no risk that the currency price at that time there was no longer available for when you can liquidate the position currency. Prices may change this in fact happens quickly. Third, as discussed above, there are two components of the premium value of an option, time value and intrinsic value.

The exercise of an option on a currency captures only the intrinsic value, time value is lost. Therefore, there are very few options and even exercise is almost always only at maturity.

The options are exercised before the expiration date are called American-style options, the options are exercised only at maturity is known as European style options.

For these three reasons, only a small percentage of option buyers choose the realization of profits derived from the commercialization of the options by exercising an option. Most choose the alternative of obtaining the clearance of the corridor, i.e. the option to liquidate the value of the premium quoted at the time.

#### **4.1.5 Endorsement of the Option and the Reasons**

So far, it has reviewed only the purchase of options, however, is that when someone buys a stock, someone else sells.

In any transaction, the seller may be someone who previously bought an option and now the settlement or the seller may be a person who engages in any commercial activity known as subscription options. The attractive part of the subscription options for some operators is the opportunity to receive the premium paid by the buyer of the option. The buyer of an option anticipates a change in the underlying currency price of the option at any time before maturity will make the option more valuable for its implementation.

Moreover, the underwriter of an option anticipates that the change in price when the option expires worthless not happen and keep the total amount of the option premium received for signing the option.

Example: at a time when the yen price is \$ 0.8400, a trader who expects prices stable or lower currency gains a bonus of \$ 900.00 through the signing of a purchase option with an exercise price of \$ 0.8600. If the currency price at maturity is below \$ 0.8600, the purchase will expire worthless and the writer of the option will retain the full premium of \$ 900.00. Your gain will be that amount, less the costs of the transaction. While the subscription options can be a profitable activity, is also a high risk activity. In fact, the underwriter of an option has unlimited risk. Except for the premium received for subscription of the option, the underwriter an option can lose any amount if at the time the money was due (unless you have paid the purchase option by the settlement).

In the example above, the operator earns a premium of \$ 900.00 through the signing of a purchase option with an exercise price of \$ 0.8600 when the market price was \$ 0.8400. If, at the price of the currency increased above the exercise price of the option for more than \$ 900.00 for the premium received, the merchant will incur a loss. For example, if the currency price at maturity has risen to \$ 0.8800, the loss will be \$ 1,600.00. This is \$

2,500.00 if the option is less than \$ 900.00 signing bonus received by the option.

As shown in this example, subscribers of options as buyers need to calculate a breakeven price. To the subscriber of a purchase, the breakeven price plus the premium received net after transaction costs. To the subscriber of a sale, the exercise price is the price of the option less the premium received after transaction costs. The profit potential of the writer of the option is limited to the amount of the premium less transaction costs. Potential losses of subscriber option can be unlimited and for that the subscriber has the option to deposit funds to cover losses, sometimes daily.

## **4.2 Styles of Options**

### **4.2.1 European Style of Options**

One option may be exercised only for a limited exercise period at the end of life of the option. This contrasts with the option of American type, which can be exercised at any time. European and American terms are derived from the regions where these options appeared first, but the terms have no meaning from the geographical point of view.

### **4.2.2 American Style of Options**

One option may be exercised at any time between the purchase date and expiration date Most of options are American type. This is the opposite of a European-style option, which can only be exercised on the expiration date. As an American style option provides an investor with a greater degree of flexibility than a European-style option, the premium for an American style option is at least equal to or greater than the premium for a European-style option which otherwise has all the same features, also called American option.

### **4.3 Exotic Options**

In their nature, generally exotic options have more than one financial transaction in them and often they have more than one options embedded or used separately. In this aspect, they show quite a resemblance with their counterparts in the Islamic Finance because it is Islamic Options' nature too to have a rather complex structure which is needed to comply with certain Shari'a rules.

In this thesis we will compare and contrast these options with each other and to do so we should first try to shed a light on the conventional ones that are Barrier and Asian Options, the ones which are the most comparable with the Islamic Options that we will examine in the later chapters of this thesis.

#### **4.3.1 Barrier Options**

##### **a) Definitions and Characteristics**

Barrier options are options whose value depends on the development over their lifespan, the price of the underlying compared to one or more thresholds. We can distinguish two product categories:

##### **Deactivating barrier options:**

These options, called type "out", European options are classic in every way except that they disappear if the price of the underlying reaches the reference period a predetermined threshold. These options may be "down and out" if the barrier is reached by a fall in the underlying or "up and out" if it is, however, affected by an increase of the underlying.

### **Options to knock:**

These options do not begin to exist only if the price of the underlying reaches a certain price fixed in advance. However, the premium is paid up front, that option appears or not after. These options can also be “down and in” if the knock is reached and the price of the underlying or “up and in” if the barrier is achieved by an increase in the underlying.

It is important to clarify some terms including names that are most often used to set these options:

No knock “in obstacle” or “knock-in” or “option lightable”

No knock “out barrier” or “knock-out” or “extinguish”

There are 8 types of barrier options: “4 calls” and “4 puts”.

The following notations are used to define their “payoff” respectively:

- $K$ : strike price,
- $S$ : spot price,
- $B$ : barrier.
- $t$ : current time
- $T$ : The time when the option is exercised.



<b>Up and In</b> ( $B > S > K$ at $t_0$ )	If $S$ becomes bigger than or equal to $B$ even once for any $t$ until maturity the payoff will be the bigger value of $(0, S_T - K)$ otherwise the option is nullified and the gain would be 0.
<b>Down and In</b> ( $S > B > K$ at $t_0$ )	If $S$ becomes smaller than or equal to $B$ even once for any $t$ until maturity the payoff will be the bigger value of $(0, S_T - K)$ otherwise the option is nullified and the gain would be 0.
<b>Up and Out</b> ( $B > S > K$ at $t_0$ )	If $S$ stays smaller than $B$ for every $t$ until maturity the payoff will be the bigger value of $(0, S_T - K)$ otherwise the option is nullified and the gain would be 0.
<b>Down and Out</b> ( $S > B > K$ at $t_0$ )	If $S$ stays bigger than $B$ for every $t$ until maturity the payoff will be the bigger value of $(0, S_T - K)$ otherwise the option is nullified and the gain would be 0.

*Table 1: Call Payoffs in Barrier Options*

<b>Up and In</b> ( $K > B > S$ at $t_0$ )	If $S$ becomes bigger than or equal to $B$ even once for any $t$ until maturity the payoff will be the bigger value of $(0, K - S_T)$ otherwise the option is nullified and the gain would be 0.
<b>Down and In</b> ( $K > S > B$ at $t_0$ )	If $S$ becomes smaller than or equal to $B$ even once for any $t$ until maturity the payoff will be the bigger value of $(0, K - S_T)$ otherwise the option is nullified and the gain would be 0.
<b>Up and Out</b> ( $K > B > S$ at $t_0$ )	If $S$ stays smaller than $B$ for every $t$ until maturity the payoff will be the bigger value of $(0, K - S_T)$ otherwise the option is nullified and the gain would be 0.
<b>Down and Out</b> ( $K > S > B$ at $t_0$ )	If $S$ stays bigger than $B$ for every $t$ until maturity the payoff will be the bigger value of $(0, K - S_T)$ otherwise the option is nullified and the gain would be 0.

*Table 2: Put Payoffs in Barrier Options*

## b) Interest

We can notice three main points in the use of barrier options:

**Option prices:** The price of barrier options can be based on the level of the barrier, much lower than that of a standard option with the same characteristics.

**Flexibility:** The multiplicity of barrier options can develop very specific strategies, both in terms of anticipation, in terms of coverage: for a given class of standard options, there are four types of barrier options.

**Leverage and Significant Performance:** Payment of a premium low combined with a pay-off “the same as a standard option in case of favorable developments in the underlying can improve significantly the lever and performance of the option.

### 4.3.2 Asian Option (Average Option)

#### a) Definitions and Characteristics

There are two types of Asian options:

**1) The option to average the price:** This is a European-style option entitling the holder to receive upon maturity of the option and up to its nominal amount, any positive difference between the price of exercise this option and the arithmetic mean (or geometric) prices of the underlying.

The “payoff” of a “call” can be expressed by:

$$X_{CallAsiatique} = \max \left( \text{Moy}_t(S_t) - K, 0 \right)$$

and that of a “put” of such an option, using the same notation:

$$X_{Put\text{Asiatique}} = \max\left(K - \underset{t}{Moy}(S_t), 0\right)$$

With:

- K: Strike price of option
- $S_t$ : Quotes of the underlying asset at time t
- Avg ( $S_t$ ): Average underlying asset.
- $Moy_t$ : Movements over year as observation numbers (in above formula).
- N: Observation numbers (in below formula).
- $S_{Obs}$ : Observed Spot Price of the underlying.

Averaging is based on N observations and can be calculated two ways:

$$\text{Arithmetic Average : } \underset{\text{Arithm.}}{AVG}(S_t) = \frac{1}{N} \cdot \sum_{i=1}^N S_{Obs_i}$$

$$\text{Geometric Average : } \underset{\text{Géom.}}{AVG}(S_t) = \sqrt[N]{\prod_{i=1}^N S_{Obs_i}}$$

**2) The average option exercise price:** The “payoff” at maturity or upon the exercise of this option is determined as the difference between the price of the asset at maturity and average exercise price calculated as the average of the underlying asset over a fixed number of points.

## b) Interest

**Reducing risk:** Unlike traditional options, including “pay-off” is exposed to a sudden movement in the price of the underlying asset at maturity, Asian options allow you to freeze the values of the Underlying during the life of the option. These options are particularly attractive when the market is weak or highly volatile liquid.

**Product flexibility:** In addition the choice of maturity and exercise price, the buyer of an Asian option buyer the possibility to determine:

- The period of observation: Instead of calculating an average over the entire life of the option, it is possible to reduce the period of observation.
- The frequency of observation: Decided during contract negotiations, it can be daily, weekly, monthly, quarterly, semi etc.
- Type of medium: Generally, the averaging is done arithmetic. However, it is also possible to use geometric mean or assign a different weighting to each value according to the will of the buyer.

#### **4.4 Risks of Options**

In deciding whether to trade currencies and high risk options where there is a significant degree of price volatility and financial leverage, you must understand and take seriously the many real risk factors undoubtedly face. Operation with coins and currency options involves an extremely high level of risk of loss. Traders can lose often all or part of the money they deposit.

Given the volatile nature of the coins and currency options, the value of your account can rise or fall abruptly without warning. This is called leverage because, in general, the value of the market position shifts in a higher rate than the underlying asset, which significantly increases the risk of loss.

As a result of adverse price movement you may suffer a total loss of your initial deposit (including commissions paid) and any other funds you have deposited. Also may be subject to losses that exceed the amount deposited in your account when operating in currencies and short options (open sale). Transactions in options are a zero sum game: For every dollar of profit there

is a dollar loss. Some studies have shown that more than 85% of small investors who have traded options eventually lose money.

One option is an extremely complicated transaction vehicle, which carries significant risks that are inherent in the commercialization of the underlying asset. For example, options lose value over time (time-decay), the choices usually do not respond fully to price movements of underlying asset (Delta). The profitability of the option depends on how important the exercise price of the option in relation to the underlying market price. Long options (purchase open) have limited risk to the amount of the option premium plus commission, however, short options (open sale) have unlimited risk. An option with an exercise price that is out of the market has only a remote chance of becoming profitable sometime.

You should be familiar with the specific risks and systematic terminology and short and long operations, buying and selling options before you deposit money to trade options. Subscription options such as negotiation strategy is totally inappropriate for the person who does not understand fully the nature and extent of risk involved and you cannot afford the possibility of a potential loss unlimited. It is also possible that in a market where prices change rapidly so that the subscriber may not have the means to control the extent of their losses.

#### **4.5 Pricing Options**

Option pricing methods are rather mathematical and complex. Basically Black & Scholes and Cox, Ross & Rubenstein models are used as option pricing models. Generally Cox, Ross & Rubenstein model is used for the pricing of American options and Black & Scholes model is used for the pricing of European options.

Both models use these parameters to calculate the option premium;

- Spot price of the underlying,
- Exercise price,
- Time left to maturity,
- Risk- free interest rate,
- Volatility.

#### **4.5.1 Greeks**

As an option premium is influenced by various factors, financial theory has developed parameters or coefficients which determine the effects of movements of these factors, and designated by Greek letters. Some of these are:

##### **4.5.1.1 Delta (d):**

Delta is the sensitivity or elasticity of the premium to spot price changes. It can also be defined as the probability that the option is exercised. Mathematically, the delta of an option is the derivative of the premium over the spot price of the asset.

In the case of a call option, while more out of the money its delta is close to zero, since small variations in the spot does not affect that position. When the money at the delta is close to 0.5, i.e. that for every 1% change in the spot the premium increases by 0.5%, and when the option is in the money the delta approaches to 1.

In the case of a put option, when money was very in the delta is close to -1, then as the spot goes up, its intrinsic value falls. If the put option is at the money the delta will be close to -0.5 and tend to zero as more is out of the money.

In short, to call the delta is between 0 and 1, and for the put is between -1 and 0.

The determination of delta allows a market participant to take different positions and manage their investment portfolios with good management of the risk-return relationship.

The delta is affected by the volatility of the underlying asset price and time, measured with the parameters vega, gamma and theta respectively.

#### **4.5.1.2 Gamma (c):**

Gamma is the sensitivity of delta to changes in the spot price (delta), and mathematically, the gamma of the option is the second derivative of the premium over the spot price of the asset. Its value indicates how much increase or decrease the delta of the option when the spot price varies.

The gamma is identical to a call and a put equivalent. Assuming the spot price increases, as the delta of the call is positive, by adding the gamma, the delta increases. For the put, as the delta is negative, by adding the gamma decreases its absolute value.

The gamma is negative only when you sell an option, and is maximized when the strike price coincides with the spot.

The gamma of an option is also influenced by the term to maturity and volatility. The increases would diminish the gamma of the options in the money and raise the rest.

#### **4.5.1.3 Theta (q):**

Theta is the parameter that measures the sensitivity of the premium over time. Mathematically it is the derivative of the premium with respect to the maturity of the option.

Theta is almost always positive, since the longer term, more raw. It is very commonly expressed as the daily loss in the option premium, by the following expression:

Loss per day =  $q \text{ year} / 365$  that can be represented in percentage or monetary units.

#### **4.5.1.4 Vega (n):**

Measures the sensitivity of the premium to changes in implied volatility of the market and is mathematically derived from the premium to volatility. Increases in volatility increase the premium of any option, therefore, all options have positive Vega.

### **4.5.2 Simple Binomial Approach**

In this section we will see the binomial approach which is introduced to the world by Cox & Ross as an early version and developed by Cox, Ross & Rubenstein to achieve an exact formula for pricing options. Besides being easier to understand, the binomial approach provides solutions not only for the price of European call options but also for highly complex pricing American put options, which (until recently) had to be solved by numerical approximation.

Before developing the analysis, it is useful to describe in detail the assumptions that have been used for the development of pricing options. They are somewhat less restrictive than those used to derive the CAPM.



We will see the binomial model by following the Benninga and Wiener's work which is in the near past and more comprehensive by being inclusive of other pricing models in their series of papers. Here are the assumptions made by Benninga and Wiener in their work in 1997:

- Capital markets smoothly and without transaction costs or taxes and simultaneous information freely available to everyone,
- No restrictions on short sales,
- Asset prices based on stationary stochastic processes over time,
- The risk-free rate is constant over time,
- The key assets pay no dividends (or cash disbursements of any kind).

Most of these assumptions can be relaxed without changing the basics of Options Pricing Model (OPM).

Here we take  $N = 1$ . We note:

$S_0$  : The course of the underlying asset in  $t_0$ .

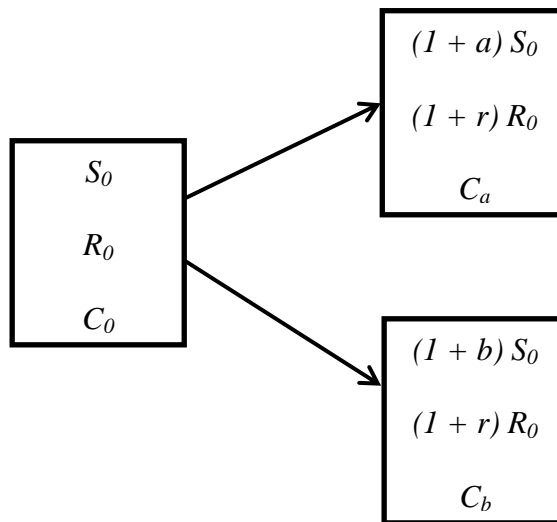
$C_0$  : Price of Call in  $t_0$ .

$C_a$  : The price of Call by 1 if the underlying asset has increased.

$C_b$  : The price of Call by 1 if the underlying asset has decreased.

$R_0$  : An amount in cash and "r" is the risk free rate over a period.

The changing course of the underlying asset, the option price and the cash can be summarized in the following diagram:

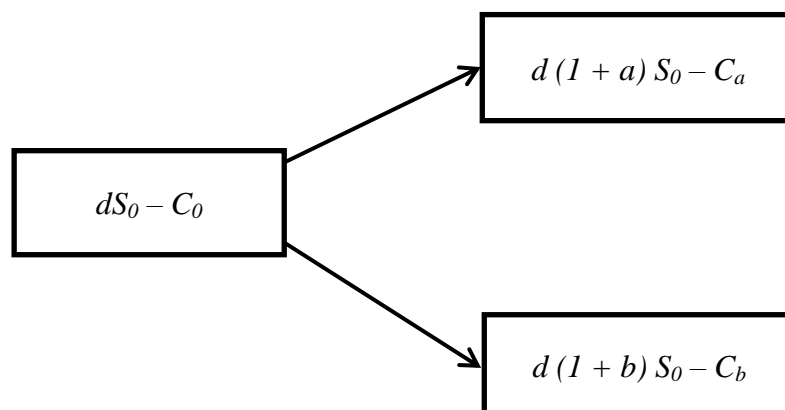


*Figure 5: Binomial Expression of Option Price and Cash Relationship*

At maturity the value of a call is given by  $(S_1 - K)_+$ . So we know the values  $C_a$  and  $C_b$ . We look for the value of  $C_0$ .

It is the assumption of no arbitrage opportunity which will allow us to obtain this value.

Consider that at  $t = 0$  we buy an option and that is to sell short the underlying assets. The price of the portfolio evolves as follows:



*Figure 6: Yields for an Option of Single Period Purchase*

This portfolio is risk free if:

$$d(1+a)S_0 - C_a = d(1+b)S_0 - C_b$$

This entails:

$$d = \frac{C_a - C_b}{S_0(a - b)}$$

The portfolio is risk-free so it should be submitted to the risk-free rate (AOA) and should therefore have the following relationship:

$$V_0 = dS_0 - C_0 = \frac{1}{1+r} V_1 = \frac{1}{1+r} (d(1+a)S_0 - C_a)$$

Hence by replacing d by its value in the term on the right:

$$dS_0 - C_0 = \frac{1}{1+r} \cdot \frac{C_a(1+b) - C_b(1+a)}{a-b}$$

We replace d by its value in the left-hand side:

$$\frac{C_a - C_b}{a-b} - C_0 = \frac{1}{1+r} \cdot \frac{C_a(1+b) - C_b(1+a)}{a-b}$$

One finally obtains:

$$\boxed{C_0 = \frac{1}{1+r} \left( \frac{r-b}{a-b} C_a + \frac{a-r}{a-b} C_b \right)}$$

### 4.5.3 Black & Scholes Model

Robert C. Merton and Myron S. Scholes, in collaboration with Fisher Black, developed a revolutionary formula for the valuation of stock options (“Stock Options”). In 1973, Black and Scholes published a simple formula for evaluating the fair price of a European call option on a share, a formula that will deduct Merton and clarify in the same year by another similar method, physics, resolution the equation of heat diffusion in a one-dimensional universe. Its momentum, this formula generalizes Merton in several directions (i.e.: several types of financial instruments), showing that this approach applies to any contingent claim paying a certain sum from the date of maturity.

In a modern market economy, officials want to choose the appropriate level of risk in the management of their transactions. Therefore, they seek to hedge against adverse events in financial markets that redistribute risks. This concern is satisfaction of coverage primarily through the options. Indeed, the options give the right but not the obligation, to buy or sell a security at a specified price in the future.

This explains the importance of accurate assessment of financial instruments for accuracy assessment of these is a prerequisite for efficient management of risk. Gold, Black & Scholes and Merton, make a fundamental contribution by showing that it is not necessary to introduce a risk premium to evaluate an option. They thus reflect the presence of the risk premium in the stock price. Thus, as in the binomial case, agents’ preferences for risk are not involved in the evaluation of option prices.

Therefore, the Black & Scholes applies to agents neutral towards risk, simplified situation. This formula is initially established for a call to action (the price could easily be found using the relationship of parity call / put) under the following assumptions:

- The option is European style
- There are no transaction costs,
- The interest rate is constant over the period,
- The successive variations in the price of the underlying asset follow lognormal distribution,
- The price volatility of the underlying asset is known and constant
- Markets are efficient,
- The principle of no arbitrage opportunity is checked.

So the pricing formula of Black & Scholes for a European call is expressed as:

$$C = S N(d) - K e^{-r\tau} N(d - \sigma\sqrt{\tau})$$

with

K: strike price of the option

C: current price of the call (i.e.: at the current time t)

S: price of the underlying

r: risk free interest rate (short term)

N(.) distribution function associated with the standard normal

$\sigma$ : volatility of the stock (i.e.: standard deviation) per unit time

$\tau = T - t =$  time remaining to maturity T by the contract, or life to maturity (i.e., residual life) of the option

$$d = \frac{1}{\sigma\sqrt{\tau}} \left[ \ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)\tau \right]$$

Diffusion followed by the pricing of the underlying is a geometric Brownian motion:

$$\frac{dS_t}{S_t} = \mu dt + \sigma dW_t$$

where

$W_t$ : Brownian motion standard normal distribution with parameters 0 and t,

$\mu$ : (Drift rate) Representing the change rate of the average price of S,

Note that  $\mu$  appears in the Brownian motion of the  $S$  for the first time because this constant does not appear in the Black & Scholes for European call. It is different for the volatility that  $\sigma$  appears both in the Brownian motion of the underlying asset and the price formula of the call. On the other hand, the price evaluation of the call by the Black & Scholes is also considering a portfolio consisting of one share and one obligation without risk of default.

To do so, Black & Scholes build a safe position (i.e.: a perfect hedge) from a call, an action and an obligation free of default risk, this position is continuously adjusted under the assumption of absence of arbitrage opportunity on the market. The resulting call price is an equilibrium price part because Black & Scholes do not assume that all markets are in equilibrium.

Under the assumption of risk neutral agents, the price proposed by Black and Scholes for a European call is equal to the expected value of the call at expiration, the latter being discounted at the risk free rate (this value corresponds according to the formula of the price of the call, the difference between the expected value of the action and the expected cost if the option is exercised at maturity). In this case, the probability  $N(d)$  and  $N(d - \sigma\sqrt{\tau})$  occurring in the formula can be considered risk-neutral probabilities, as in the binomial model. Specifically,  $N(d - \sigma\sqrt{\tau})$  represents the risk-neutral probability that the call expires in the money while  $S e^{-rt} N(d)$  represents the expected risk-neutral price of the asset underlying the expiry date of the option, conditional to the fact that the call is in the currency.

The approach of Black, Merton and Scholes originally designed to calculate the value of a product derived estimates of constant volatility, also allows to calculate the volatilities of the market from the real prices of derivative assets on the market (Quotes of the market price of the option is then used to gauge market volatility) is the implied volatility. Indeed, the Black &

Scholes can be inverted to find the parameter  $\sigma$  of the implied volatility of option prices considered. This shows that the implied volatilities derived from this formula for different products, on the same underlying asset  $S$ , depend on both the time remaining until maturity (i.e.: the life at maturity) and above the exercise price of the option.

This functional dependence is described respectively term structure of volatility (this varies depending on the products and time periods considered) and “volatility smile”. This term structure characterizes the fact that, under certain conditions (for the position of the course of the underlying relation to money, and some dates), the Black & Scholes tends to systematically underestimate or overestimate derivatives pricing.

This observation leads to conclude that volatility is not constant, which contradicts the assumption made by Black & Scholes. In fact, volatility is sensitive to political, economic and financial which explains in part that it varies over time is often accompanied by a phenomenon of non-stationarity.

This feature of random variation in volatility over time has spawned a new generation of option pricing formulas allowing non-constant volatility. These models were based always on the same approach as the Black & Scholes. They attempted to reproduce the effects of volatility smile by imposing restrictions on the term structure of volatility.

Now that we saw the general aspects of conventional options a bit comprehensively it is time for us to get into the matter of Options in Participation Banks and then compare them on the aspects that we did and will saw.

## **5. OPTIONS IN PARTICIPATION BANKING**

Before getting into our topic which is Options' Uses and Implications in Participation Banking we should briefly mention the global position of Islamic Banking, its working principles and few notes to help understand why it is different and more difficult to engineer financial instruments for Islamic Banking.

First let us mention generally about the position of Islamic Finance in the global arena.

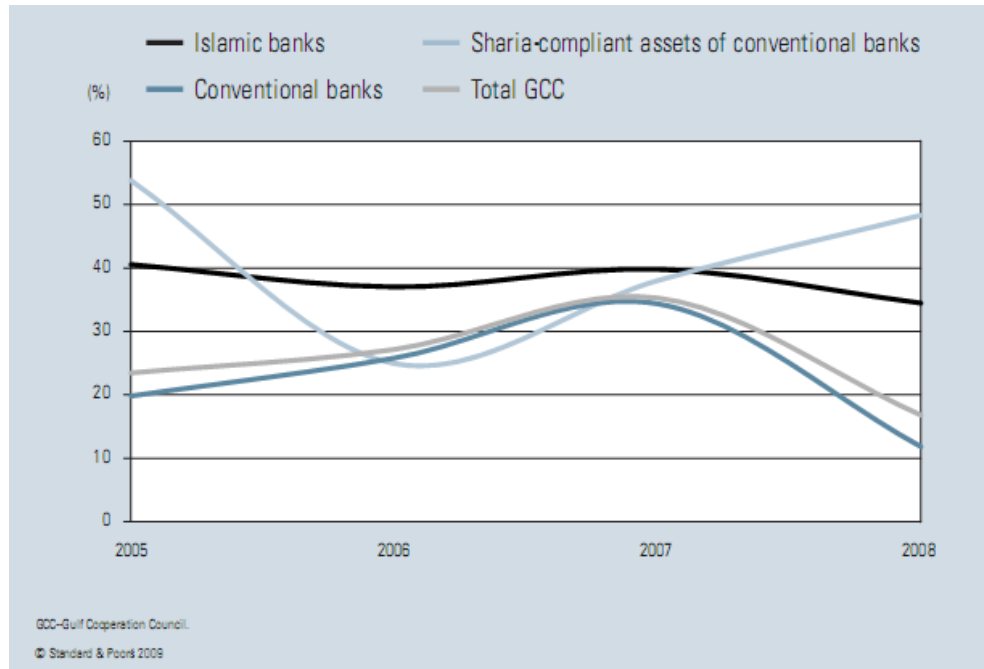
### **5.1 Global Position of Participation Banking**

In the last ten years, Participation Banking (Islamic Banking or Islamic Financial Services) has shown a great pace of growth. Although it is not with exact figures, the estimated assets of Islamic Financial Institutions all over the world as of 2005 totaled USD 230 billion, in 2009 top 500 Islamic Financial Institutions expanded 28.6% to USD 822 billion and now total assets of Islamic Financial Institutions are estimated to be around USD 1 trillion.

In over 75 countries Participation Banks or rather Islamic Financial Institutions exist and they are expected to grow in years to come. It is a fact that the main clientele of this sector is Muslims and there are over 1 Billion Muslim who yet to be gained as customers.

This shows us that there is a big potential to grow and place to move for Participation Banking if they were to succeed in increasing the awareness about the Islamic Banking among Muslim population all over the world before concentrating on to the full market clientele.





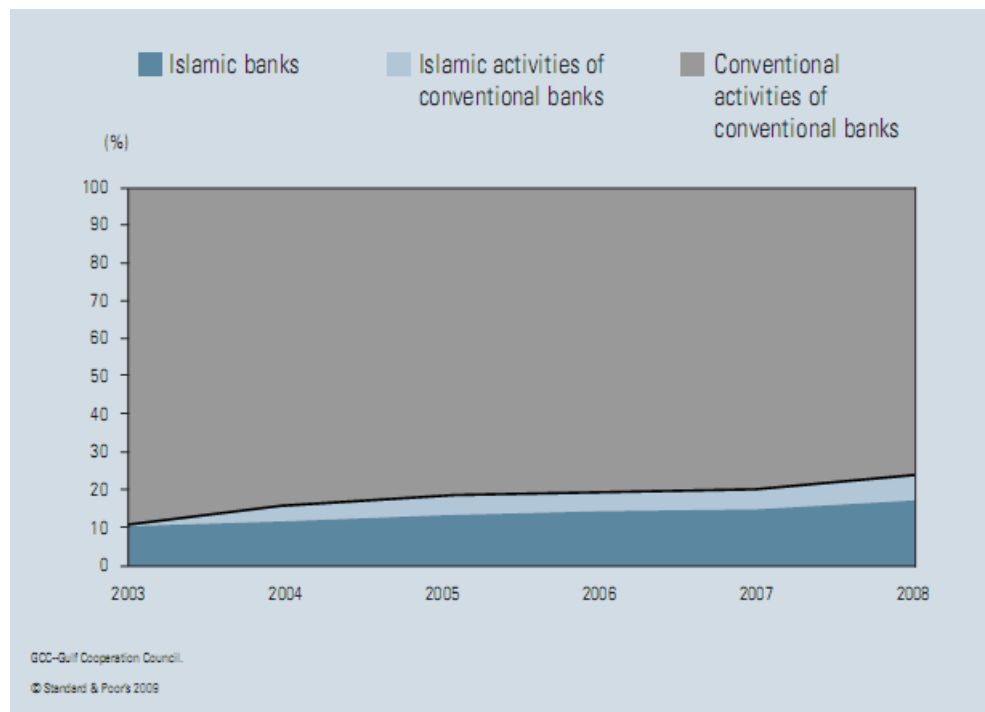
*Chart 1: Growth Rate Banking Assets by Segment  
(Standard & Poor's, Islamic Finance Outlook 2010)*

This chart shows us more than that should normally does. We can see from this chart, how the beginning effect of the 2008 crisis on banks differs from segment to segment. As it seems, Islamic Banking assets are less affected by the crisis and continued to grow but conventional banking assets are diminished on the contrary while their Islamic Banking Windows are showing a substantial growth over the Islamic Banks total.

This shows us that aside from being different in practice, Islamic Banking in its own working principles does differ in results of its activities even though these activities and financial instruments are engineered to substitute their conventional counterparts.

On the other hand, as it seems *Shari'a* compliant assets of conventional banks exceeds the total assets of Islamic Banks which is of course because of the difference in size of the client portfolios. Aside from the conventional banks' having bigger market share in almost everywhere in the world, Muslim population seems to care about more for working principles

(*Shari'a* compliance) rather than the names or the owners of the banks. So they are willing to deposit their money or use the services of conventional banks' "Islamic Banking Windows". Islamic Banking Windows are almost like a bank inside a bank. Today almost all international conventional banks practice Islamic Banking via their "Islamic Banking Windows". Of course to be completely *Shari'a* compliant, these windows/departments should be completely separated from all aspects of the conventional part of the bank. For example the accounting should be separated and the deposits should be separated so the profit they earned can be calculated separately and etc.



*Chart 2: The Growing Importance of Islamic Banking Activities of Conventional Banks*  
(Standard & Poor's, Islamic Finance Outlook 2010)

The Chart 2 (above) further supports this observation and shows us that Islamic activities of conventional banks significantly exceed the Islamic Banks' activities. On this matter the interpretation of Standard & Poor's is highly pertinent with the topic of this thesis.

***“Competition Is Mounting, With Conventional Banks’ Islamic Windows Actively Challenging Fully-Fledged Islamic Banks***

*Pioneering Islamic banks that have managed to acquire quasi-monopolies in their domestic niche markets are now facing stiff competition in our opinion. Their first mover advantage is shrinking in their domestic markets and we understand they are now looking at business and/or geographic diversification strategies. Conventional banks entering Islamic banking currently constitute the most active competitive threat to established Islamic banks. The latter accounted for 71% of sector assets at year-end 2008 compared with nearly 100% in 2003.*

*This is mainly explained by the entrance of conventional Saudi banks making their retail business Sharia-compliant. The market shares of conventional Qatari and UAE banks, through Islamic windows, are also expected to grow rapidly. **The business model of commercial Islamic banks in the Gulf is in our view focused on offering alternative banking products and services to their customers, rather than entering into new segments like venture capital or microfinance. This inclination has in our view generally eased the substitution of conventional banking products and services by Sharia-compliant equivalents.** Markets are therefore slowly moving from monopolies or oligopolies to much more competitive structures.” (Standard & Poor’s, Islamic Finance Outlook 2010)*

This is about the pressure coming from both sides. First of all there is a need for derivative instruments which comes from the customers and there is the need of Islamic Financial Institutions to engineer this kind of alternative banking products to cope with the rivalry, and at this point the rivals are seem to be the Islamic Banking Windows of conventional banks.

With the pressure coming from both sides and the already established habit of engineering new financial instruments –gained while engineering *Shari’a*

compliant equivalent of all conventional financial transactions and clean them from their non-*Shari'a* compliant aspects such as interest etc.- Participation Banking began its journey in the Derivative Financial Instruments arena.

Of course this is not an easy way for them because almost every financial instrument of Islamic Banking is one or two times complex and different to apply from its conventional equivalent. To understand why, let us see how different the Islamic Banking from the conventional banking.

## **5.2 Characteristics of Participation Banking**

As it is known Islamic Finance need to abide by certain rules called *Shari'a*, which consist of rules in “The Qur’an” and “The Prophetic *Sunna*” the sayings and actions of the Prophet. Islamic Financial Institutions must work and engineer new financial instruments while considering and fully abiding these rules otherwise any existing or new financial instrument of that institution would not be *Shari'a* compliant which impels them to be a Conventional Bank and thus lost its clients who were with them solely because of these rules in the first place.

If we consider the above rules and already existing Conventional Banking’s standards, rules and modern law which are also mandatory for Islamic Banking, we can infer that working as a participation bank (Islamic bank) and especially engineering a new financial instrument which should be both modern law and *Shari'a* compliant is more difficult for the players in this sector.

Be that as it may, Financial Institutions are not always in a consensus in every topic about being *Shari'a* compliant which is at the most time controversial. Being *Shari'a* compliant takes the most important role while engineering a new financial instrument because if it turns out to be not *Shari'a* compliant, the time and money invested in engineering this

instrument would go to waste and to prevent this, Financial Institutions have *Shari'a* Boards which inspect new products and existing applications in terms of *Shari'a* compliance.

Although it seems as a necessary and a good system, in practice it may and sometimes does create divergence between Financial Institutions' applications. It is because there is not one and united authority in this matter all over the world so "every Islamic financial institution for itself" rule sometimes results in different implications in some financial instruments especially in engineered ones. It is different from country to country of course. For example; in Persia there are institutions to regulate this matter such as "Islamic Consultative Assembly" and "Guardians Council" but it is limited to Persia of course. But generally Islamic Financial Institutions use their own assembled *Shari'a* Boards for their internal *Shari'a* compliance control.

The financial instruments that we mentioned above as "engineered ones" include this thesis's topic which is Options. Options are indeed engineered financial instruments. But Participation Banks are not far from engineering financial instruments because they use complex patterns and combinations of different products even in the implementation of simplest of financial products because they need to comply with *Shari'a* rules.

For example; Participation Banks do not and cannot deposit credit to its credit customer because it is against *Shari'a* rules, instead they make the payment to the other party to whom their customer is willing to make her/his payment originated from her/his commercial activity. This is the very basic of fund utilization in a bank and even here Participation Banking differs and become a bit more complex than Conventional Banking.

We can multiply this example with *tawarruk* (refinancing or debt restructuring). In a conventional bank restructuring a debt is as simple as

giving a loan in the first place. However in Participation Banking it is far more complex and difficult to exercise because of its own set rules, *Shari'a*. It is the same with the engineering the *Shari'a* compliant options for Islamic banking.

At this point, one should be informed the main rules of Islamic Banking (to be *Shari'a* compliant) to fully comprehend this matter. Let us see the main elements to abide to be *Shari'a* compliant and return to this topic to conclude.

### **5.2.1 Principles of Participation Banking**

- **The Ban On Interest**

“Interest must not be charged or paid on any financial transaction, as interest (or the intrinsic value of the money) is deemed unlawful by *Shari'a*.”

- **The Ban On Uncertainty Or Speculation**

Uncertainty in contractual terms and conditions is forbidden. However, risk taking is allowed when all the terms and conditions are clear and known to all parties.

- **The Ban On Financing Certain Economic Sectors**

Financing of industries deemed unlawful by *Shari'a* –such as weapons, pork, and gambling- is forbidden.

- **The Profit and Loss Sharing Principle**

Parties to a financial transaction must share in the risks and rewards attached to it.

- **The Asset Backing Principle**

Each financial transaction must refer to a tangible, identifiable underlying asset.” (Standard & Poor’s, Islamic Finance Outlook 2010)

These five elements explaining briefly the working principles of Participation Banking is quite comprehensive. Other than the ban on uncertainty or speculation the other for elements are quite self explanatory.

Gaining interest on money, solely on the action of borrowing money at that, as all we know is prohibited in Islam. It is very logical to think this element to be, at the same time, the natural result and cause of the asset backing principal which totally takes away the earnings from the action on solely borrowing money aspect by stipulating that every financial transaction must refer to a tangible, identifiable underlying asset which means a commercial product or service in that sense.

Of course because of related prohibitions in Islam, to work in some industries are deemed unlawful by *Shari’a* such as weapons, pork and gambling etc. which are directly prohibited, not just working with them financially. So we can generally infer that if something or some action is prohibited in Islam, financing it (that industry) becomes prohibited too.

The profit and loss sharing principle shows itself in the name of Participation Banking. Of course here participation refers to participating in the profits and losses of the financial transaction at hand. This means that in a financial transaction both parties must take a portion of the risk attached to the act of performing of the deeds in the agreement. None of the parties of the agreement should have zero risk and fixed earnings in that sense. It is perceived as injustice.

As to the ban on uncertainty or speculation, there are two terms which take the most attention and may be the most relative to the objections on the

*Shari'a* compliance of Options. These terms are *maisir* and *gharar* which generally and briefly means gamble and uncertainty respectfully. In *maisir* (gambling) there is a broader meaning than just gambling. It also means unearned profits. In Islam, profits from gambling deemed unearned thus unlawful but in principle unearned profits may be gained by the ways other than gambling which would also be banned of course.

Some Muslim scholars think that unlimited earnings gained from options are unlawful because of the argument that these earnings would be *maisir* (gambling) too. And in this sense, if one party of this agreement could gain unlimited unearned profits, then the other party possibly could face massive losses –because this is a zero-sum game (one party of the agreement losses the exact amount of the other party's earnings thus the sum of the earnings and the losses would be zero)- which would indicate a possibility of default by the loser and hence *gharar*.

Here of course there is the assumption that the party that faced a default would not agree on such a transaction beforehand so it seems that there is a lack of information and existence of uncertainty and deceit and that what makes the resulting loss a *gharar*.

Now that we generally covered the main principles of Islamic Banking we can return to our previous topic “Engineering Islamic Options”.

### **5.3 Evaluation of Options in Participation Banking**

Options, as standalone financial instruments do not have any exact correspondent product in classical Islamic Banking but it is evaluated under the names of *al-khiyar* (a *fiqhi* (a term to describe Islamic Law generally) concept for various kinds of embedded options) and '*urbun* or *bai al-urbun* (down payment sale) by some scholars in Islamic Finance field.



Although there is not a consensus on the matter whether or not standalone options are permissible when it is for hedging an already existing risk exposure originated from a commercial activity, it is a generally accepted (there are exceptions which we will mention below) view that standalone option contracts for speculative reasons are not permissible in Islamic Finance.

Even though the permissibility or justification of Islamic Financial Instruments is not our main concern we should at least fairly mention about certain aspects of the matter because it is these aspects that would bring us to the answers of why and how questions about the Islamic Financial Engineering of options.

The generally accepted view among *Shari'a* scholars, “a promise to sell or buy a *maal*” (in a wide meaning “tradable commodity”, in a narrow meaning “tangible assets”) which is a narrow definition of an option contract, cannot be the subject of a financial transaction only by itself.

Dr. Obiyathullah Ismath Bacha (A well-known scholar in Islamic Finance and a Professor in The International Centre for Education in Islamic Finance, INCEIF) summarizes this topic as; “When viewed solely as a promise to buy or sell an asset at a predetermined price within a stipulated period, *Shari'a* scholars find nothing objectionable with options. It is in the trading of these promises and the charging of premiums that objections are raised.”

Although it seems there is a consensus on the matter that standalone option contracts are not permissible in *Shari'a*, a minority view in Malaysia includes any kind of *manfaa* (benefit) in the definition of *maal* (tradable commodity). So this view considers standalone option contracts as permissible since options involve a *manfaa* (benefit) (a right without any obligation) for the buyer and this view forms the exception in this matter.

The key problem seems like to be that the evaluation has always been from a purely juridical view point and like most juristic evaluation, have relied on precedence may be. However there is neither any precedence nor equivalence for the kind of risk-management problems faced today. When extrapolating/inferring *Shari'a* scholars need to consider that the template may be wrong. The object of juridical analysis appears to be a micro examination of each and every feature of a derivative instrument to see if it passes, an often subjective religious filter.

As we can see there are various arguments ongoing on the matter of the permissibility of Options as an Islamic Financial Instrument by *Shari'a* scholars but since there is not a consensus and there are different applications, we will continue this matter from the applications and examples of Options in Participation Banking.

#### **5.4 The Applications and Uses of Options in Islamic Banking**

So as we have seen so far, standalone option contracts are not permissible in Islamic Banking and option embedded financial instruments, however more complex, are deemed permissible. Let us continue with the characteristics and applications of the instruments that we mentioned above which are *al-khiyar* (a *fiqhi* (a term to describe Islamic Law generally) concept for various kinds of embedded options) and *'urbun* or *bai al-urbun* (down payment sale).

##### **5.4.1 Al-Khiyar**

Options in the form of *al-khiyar* are essentially permissible in Islamic Finance. While options in general can include any kind of rights without obligations that have financial implications, *al-khiyar* refers to a specific type of right in the contract given to the either or both parties, to confirm or rescind the contract. As it is mentioned in the previous sections of this thesis, the uncertainty or absence of relevant information about the contract

is called *gharar* and avoidance of “excessive *gharar*” (a very small amount of *gharar* seems to be tolerable) or uncertainty is an important requirement for a valid contract in Islamic Banking. A valid (*Shair’a* compliant) contract may still be entered into under conditions of *gharar* relating to the certain aspects of the contract i.e. exchange, price etc., but with a provision of options given to the parties to be affected by the same. The provision of options in *al-khiyar* contract helps reduce *gharar* and makes it a *Shari’a* compliant and valid contract. It helps undo the possibility of wrong fulfillment of the act on a party deliberately or unintentionally. Islamic options are also found permissible on grounds of other larger benefits to the society. Via options, the parties of the contract are granted a ‘reassessment’ or ‘cooling off’ period in which they can rationalize their decisions or reverse it. So, possible conflicts between the parties because of their abrupt, irrational and wrong decisions are minimized.

Generally, the classical *fiqh* (a term to describe Islamic Law generally) classifies *al-khiyar* formed-options into the below categories (though minor variations in the classification reported by some scholars):

- *Khiyar al-shart* (option by stipulation),
- *Khiyar al-tayeen* (option of determination or choice),
- *Khiyar al-ayb* (option for defect),
- *Khiyar al-ruyat* (option after inspection) and
- *Khiyar al-majlis* (option of session).

Among the various options, the one that have promising future for being included in the designs of new financial instruments for risk management is “*khiyar al-shart*” (option by stipulation or option as a condition). We will take into consideration this type of options while reviewing the designs of risk-management products for Participation Banking.

The right to confirm or to cancel the contract within a stipulated time period is given to the both parties of the *Khiyar al-shart* contract or even to a third party. Hence, before making their final decision about the contract, concerned party/parties get some time for thinking the benefits and costs of the agreement thoroughly. Such option is also called as *khiyar al-tarawwi* (option of reflection) by some scholars.

There is a consensus among scholars belonging to all major schools on matter of the permissibility of *khiyar al-shart*. Even though there is divergence of view among jurists on whether options and other contractual conditions are valid as a principle, or these are just tolerated by being perceived as exceptions, there is a consensus between jurists that such stipulations providing options to either or both of the parties are valid in the Islamic Financial Literature.

So, contracts involving exchange of values either from one end or both, and which may be revoked at any later date, may include these options. We can summarize the discussions in the literature devoted to the subject by reviewing the primary considerations of various jurists which are; benefit of both parties of the contract and avoidance of any potential conflict between them. The following remarks that have been generally accepted are worth mentioning.

- 1) Option contracts can have maturities of any duration as long as it is definite and known at the time of agreement,
- 2) The option buyer can have the possession of the goods in the option's duration. As such, the option writer (seller) can have the possession of the contracted price in the option's duration,
- 3) The price at the time of settlement can be different from the price at the time of agreement under certain conditions,

As we will visit this matter later on, this last remark reveals the possibility of managing the risks which are originated from price volatility and are highly common in modern markets.

Now, we will attempt to analyze and demonstrate certain uses and applications of *khiyar al-shart* for managing various risk factors over several examples.

#### **5.4.1.1 Khiyar Al-shart on Leasing Contracts**

*Ijara* (Islamic leasing) is a popular model of financing among Islamic banks for financing of long-term assets, such as, buildings, lands, plants and machinery. In case of *ijara* financing some risk factors can be easily shifted or shared via conditions in options.

The main origin of risk for Islamic banks (lessor) and their clients (lessee) is the fixed rate nature of this agreement. In a dynamic economy rates of returns continuously shift. If the rates of returns are expected to rise and drive up the cost of funds for the lessor (bank), then the bank would be at a disadvantage. As such if rates are expected to fall, the lessee (client) would be reluctant to go for a fixed rate rental agreement.

Be that as it may, it is obvious that a fixed rent *ijara* can be converted into a floating rate *ijara* via entering into consecutive short-term fixed rent *ijara* contracts. Let us consider a simple two-period case; assume that the Islamic bank expects the rates to rise from 'a' percent to 'a + b' percent during the next period.

Now, instead of making an *ijara* contract with two-period maturity at the current 'a' percent rate and be exposed to risk of loss, the bank can go for two consecutive one-period *ijara* contracts: the first at 'a' percent and the

second at 'a + b' percent. The forward commitment to lease is permissible in *Shari'a*.

However, in this way the problem is only partially solved because the bank would still have to estimate the right rental rate as 'a + b' percent and the actual rates in the future will probably be different from 'a + b' percent. Another problem could be that the expectations of the lessee (client) may be the opposite of the lessor (bank) in which case, no agreement would be feasible.

A possible solution can however be found in the framework of *khiyar al-shart*. Both the bank (lessor) and its client (lessee) can agree on a contract for the second period and stipulate options for either or both of them. The bank can say that if the rates rise beyond a percent or any other determined upper bound, it would have an option to assent or revoke the contract.

Similarly the lessee (client) can say that if the rate decreases beyond a percent or any other determined lower bound, it would have that same option. Both parties can stipulate according to the risk they are willing to carry and the way they agree to share risk.

#### **5.4.1.2 Khiyar Al-shart on Utilization**

*Ijara* includes higher leverage for the client (lessee) and increases the financial risk. If the leverage is already too high (i.e. aviation industry) the client would not want to increase its financial risk further. An alternative may be linking the *ijara* contract to the actual utilization of the object of leasing (i.e. flying hours in case of an aircraft leasing / *ijara*). However, this agreement would expose the bank (lessor) to a greater risk because now its revenues from the *ijara* rental would be exposed to the business risk of its client (lessee).

Here, stipulations of *khiyar al-shart* can be instrument of various risk sharing possibilities between the lessor and the lessee. For instance, the bank may stipulate that the rentals would be linked to the actual utilization (flying hours) of the aircraft with a minimum utilization. In other words, if the actual utilization falls below a predetermined (at the time of agreement) lower bound, it would have an option to revoke the contract. A similar option can also be stipulated for the lessee.

#### **5.4.1.3 Khiyar Al-shart on Stock Market**

*Khiyar al-shart* can also be useful for risk management in financial markets which are characterized by volatile prices, i.e. the stock market. For example, an Islamic equity fund wants to buy (or sell) stock A three months later from now. It will be bad for the fund if price goes up (or down) in these three months.

As we know conventional funds can hedge against such adverse price movements by buying a call (or put) option. And at the end of three months, even if the price goes up (or down), the fund would not be affected since it can buy (or sell) at the defined exercise price. Be that as it may, this contract would not be admissible in the Islamic Finance on various grounds as we mentioned earlier.

Now, let us consider an alternative scenario in the *khiyar al-shart* framework. The fund can enter into a purchase (or sale) contract and stipulate an option for a period of three months. The delivery of contractual price (of stock A) can now be deferred for three months.

At the end of three months if price of stock A goes up (or down) then it can confirm the contract of purchase (or sale) at the determined contractual price and so be immune from the price risk. However, if the price of stock A goes

down (or up) then the fund can revoke the contract and purchase (or sell) it in the market, so would not lose the potential profit.

So, the *khiyar al-shart* can give a benefit for the party which holds the option, at the cost of the counterparty. However, the disadvantage caused by this option to the counterparty can and should be compensated in the form of higher contractual price. **This compensation must be a part of the contractual price (*thaman*) and cannot be paid separately and upfront to the counterparty. It is this special feature that differentiates Islamic options from their conventional counterparts.**

#### **5.4.1.4 Khiyar Al-shart on Procurement**

Now, let us consider the case of *istijrar* (A master agreement to execute procurements, which allows some uncertainty regarding the sale price) with options for either or both parties. In these agreements (*istijrar*) working capital needs are financed by the banks hence the goods purchased are needed repeatedly by the buyer. So generally *istijrar* contracts are procurement contracts in which client makes several purchases, say weekly, in a defined time period.

In an *istijrar* contract, options are designed to take care of only extreme movements, so, the options are activated only when the market price reaches a bound. The bank's option would be activated if price reaches an upper bound and the client's option would be activated if the price reaches a lower bound. The contract would then be a case of a financial transaction with options for both the buyer and seller, which are activated if the market price reaches an upper or lower bound respectively, during the financing time period.

The option gives a party the right to fix the sale price at the average of the market prices that occurred during the financing period. It is assumed that



the average of market prices reflects the “normal price” of the commodity. If the options that are stipulated in the contract do not get activated or are not exercised, then the price is settled at the predetermined contractual price. Both the client and the bank agree on a public indisputable source of price information and also a sampling interval for the observation of prices because the average price will be calculated from these observations. As described above, *istijrar* with *khiyar al-shart* for both parties becomes a complex instrument, which seems similar to the certain traditional financial engineering products, such as, barrier options and the Asian (average price) options. An *istijrar* transaction can be structured as: an entrepreneur in need of financing its procurement of raw materials agrees with a bank. The bank buys the raw material specified by the client at a current price ( $P_0$ ), and sells them to the client for a payment to be made at an agreed upon date in the future – for example at the end of three months. The price at the end of this period depends on how the prices occurred from ( $T_0$ ) to the day of maturity ( $T_{90}$ ).

There is an example of this kind of agreement which is executed by Muslim Commercial Bank (Pakistan). In this example, on the contrary of what we mentioned until now, the right which the options provide for the parties is the right to fix the settlement price at the pre-determined provisional price. So if the options are not triggered (reaches the either bounds) or exercised the settlement price would be the average market price that occurred in the contract period. MCB’s *istijrar* instrument contains embedded options, which is the right to fix the settlement price at any time before contract maturity. At the time of agreement ( $T_0$ ) both parties should agree on;

- (i) A provisional settlement price  $P^*$ ,
  
- (ii) An upper and a lower bound around the  $P_0$  where  $P_0$  is the bank’s purchase price at  $T_0$ .

### **Istijrar Financing by Muslim Commercial Bank (MCB)**

*“Istijrar is an Islamic mode of financing for transactions relating to various commodities, raw materials and goods such as cotton, edible oils, pharmaceuticals, including a range of other products, which does not charge a profit on the basis of time. Instead, the sale price, payable to the Bank, is determined by market forces.*

*Istijrar financing enables buyers to conveniently obtain commodities, goods and raw materials, required by them in their trading, supply and manufacturing operations. Istijrar is an instrument, with built-in options, aimed at reducing the inherent risks, in case of volatile market price fluctuations.*

*The sale price is taken as the average of the market prices, during the financing period, relating to the particular commodities/goods involved in the transaction, determined by authentic and undisputed sources. The istijrar Agreement provides an option to the buyer to fix sale price at any time on or before the due date, provided that the market prices exceed the defined upper limit. The price would then be payable by the buyer to MCB on the due date.*

*Similarly the MCB has the option to close the deal under volatile price fluctuations, provided that the market price falls below the defined lower limit. In such case, MCB will declare the pre-determined provisional price to be the sale price, to be paid on the due date.” (Obaidullah, M., 1998, ‘Financial engineering with Islamic options’, Islamic Economic Studies, Vol. 6, No. 1, pp. 73-103.)*

For better clarification, the different prices are shown in Exhibit 1 in a graphic.

If

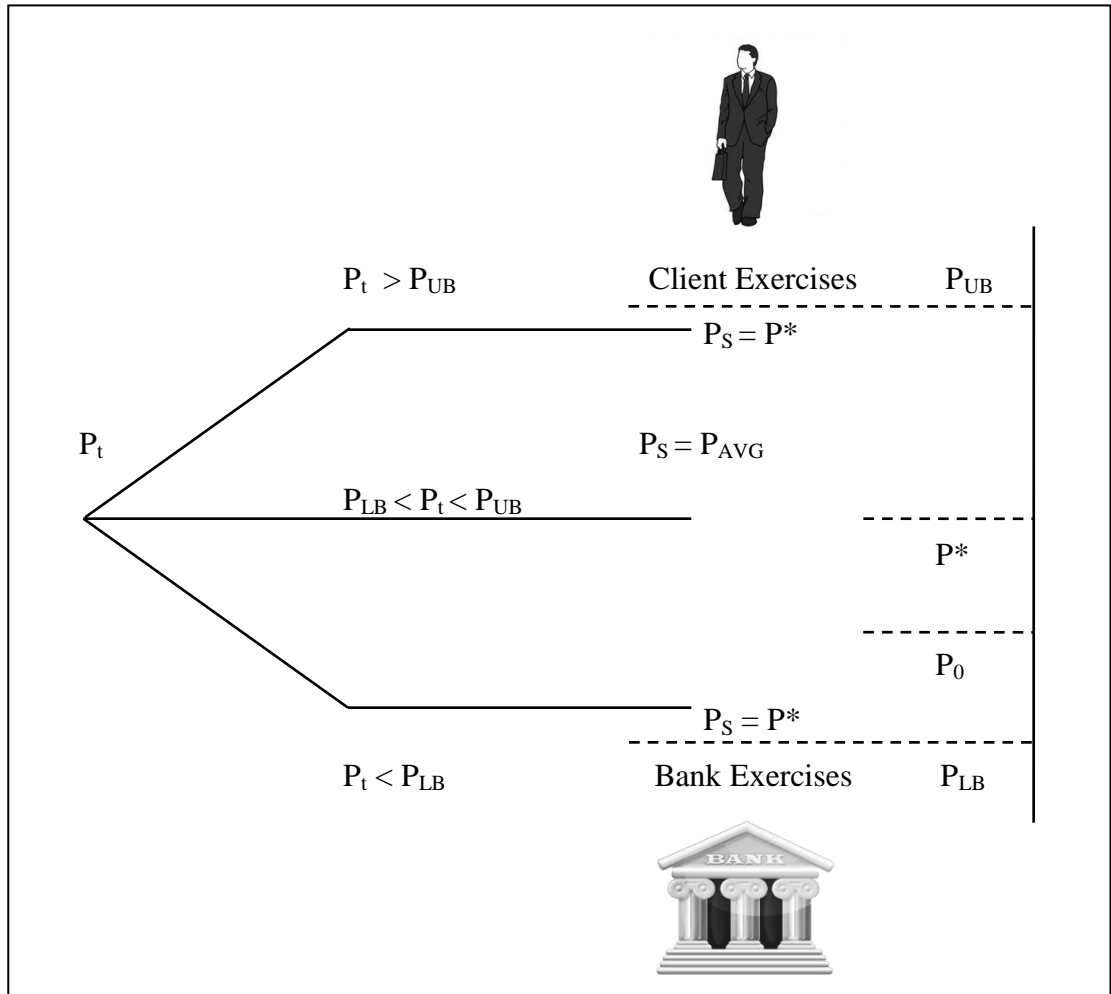
$P_0$  = Price that bank pays for underlying commodity to purchase it,

$P^*$  = Provisional settlement price,  $P^* = P_0 (1 + r)$ ,

$P_{LB}$  = Lower bound price,

$P_{UB}$  = Upper bound price,

$P_{AVG}$  = Average price.



*Exhibit 1: Price Fixation under Istijrar*

*(Obaidullah, M., 1998, 'Financial engineering with Islamic options',*

*Islamic Economic Studies, Vol. 6, No. 1, pp. 73-103.)*

The actual settlement price ( $P_S$ ) at  $T_{90}$  will be as;

**(i)**  $P_S = P_{AVG}$ ; if the underlying commodity price remains within the bounds;

or

**(ii)**  $P_S = P^*$ ; if the underlying commodity price reaches the bounds and one of the parties exercises its option and use  $P^*$  as the settlement price at maturity.

Remember that these options enable the parties to save themselves against extreme volatilities in price. It gives them the right to choose between

average price and a provisional pre-determined price. When spot price keeps rising and pierces the upper bound it would be wise on the part of the client to exercise his option and choose the provisional price instead of average price which seems to be higher than the provisional price.

Of course his decision would depend on his expectations about the spot price's movement over the remaining period of the contract. If he thinks that price will continue to increase (so the average price will be higher than the provisional price), it would be wise for him to exercise his option and fix the settlement price at  $P^*$  (provisional price). If the opposite of this happen and spot prices fall and break the lower bound, it would be wise for the bank to exercise its option to fix the price at  $P^*$ .

#### **5.4.1.5 Valuation of Khiyar al-Shart**

As we have seen in the MCB example, the option to the client is in the nature of an up-and-in call (an option that becomes effective if the market price of the underlying security rises above a predetermined price) and the option to the Islamic Bank is in the nature of a down-and-in-put (an option which becomes effective if the market price of the underlying security drops below a pre-determined price). Further the options are in the nature of average price (Asian) options. The value of these options to both of the parties must be equal.

Obaidullah has arrived at the condition for equality using the standard valuation approach suggested by Cox, Ross, and Rubinstein (1979) that assumes that the underlying price follows a multiplicative binomial process.

**Here it may be noted that the traditional models attempt to compute value of an option with the aim that the option would be priced accordingly in the market. In this case there is no such objective and hence, the exercise does not violate the Islamic norm that options**

**should not be priced and be the subject of sale. The only objective here is that the worth of the options granted to both of the parties should be the same and the valuation models used for this purpose alone.**

The parameters that determine the value of a barrier option are as these;

An up-and-in call's value is directly related to the current market price. The higher the current market price, the bigger is the probability that price would pierce the upper bound and would remain above the exercise price on the maturity. For the same reasons, the up-and-in call's value is inversely related to exercise price, and to the upper bound.

The case for a down-and-in-put would be opposite. Its value will be inversely related to the current market price and will be directly related to the lower bound.

The other parameter, which is found in the conventional models, is the interest rate. However, since we are assuming an Islamic financial system, Obaidullah chooses to assume in this valuation that interest rates would either cease to exist or would have no impact on the values of the options for an Islamic investor.

Lastly, volatility has a direct impact on all option values, also. Let us mention that since we are considering the case of average price (Asian) options, the volatility measure needs further adjustment. The exact relationship between the volatility of an ordinary European option and the volatility of an average price option depends on the frequency with which prices are observed for averaging. If the average is calculated from daily observations, the volatility of the average rate option will be 57.85 percent of the corresponding European option volatility. Obaidullah derived this as follows:

In European options, the price variable is always a stochastic variable while in case of the average price option, larger and larger part of the average price becomes non-stochastic as time passes. Let  $\sigma^2$  be the annual variance and  $P$  be the random price variable.

The variance for the first day is  $\sigma^2(1/365)$  same for both of the options since the variable is same. The price will be observed at the end of the first day and the result will serve as the first of the data to calculate the average. The random variable for average rate option is no longer  $P$  on the second day, but  $(364/365)P$  with a variance of  $(364/365)^2\sigma^2(1/365)$ . The daily variance will continue to decline and on the last day would be  $(1/365)^2\sigma^2(1/365)$ . Averaging all the daily variances and comparing with the daily variance for the European option gives us the result above.

Aside from the effect of volatility, averaging process produces an interest rate effect, which is not relevant in our framework. Now that the averaging effect is captured in the volatility measure, in the model, the modified measure is taken into account to value the barrier options.

Obaidullah also assumes that upper bound is higher than the exercise price which is again higher than the lower bound. J. Orlin Grabbe (1996) follows the Cos, Ross, and Rubinstein approach and provides C code for numerical pricing of barrier options. (For the valuation technique of barrier options in C-code, see J. Orlin Grabbe (1996), International Financial Markets, Englewood Cliffs, Prentice Hall, pp. 205-211)

Decoding the same and assuming a zero interest rate Obaidullah finds the value for an up-and-in call and a down-and-in put. The assumption of a zero interest rate greatly simplifies the model.

Obaidullah uses the following notations and valuation model:

S = current market price

K = exercise price

H = upper bound

L = lower bound

$\sigma$  = volatility measure

The value of an up-and-in call  $V_c$  can be shown as;

$$= S * N(d_1) - K * N(d_1 - \sigma\sqrt{t}) - H * N(-d_2) + S * K / H * N(-d_2 + \sigma\sqrt{t}) \\ + H * N(d_1 - \sigma\sqrt{t}) - S * K / H * N(d_1) - S / H * N(d_1)$$

where;

$$d_1 = [\log(S/H) / \sigma\sqrt{t}] + [\sigma\sqrt{t}/2]$$

$$d_2 = [\log\{(H * H) / (S * K)\} / \sigma\sqrt{t}] + [\sigma\sqrt{t}/2]$$

$N(x)$  = value of the standard normal distribution for x

The value of a down-and-in put  $V_p$

$$= -S * N(d_3) + K * N(-d_3 + \sigma\sqrt{t}) + L * N(d_4) - S * K / L * N(d_4 - \sigma\sqrt{t}) \\ - L * N(-d_3 + \sigma\sqrt{t}) + S * K / L * N(-d_3) - S / L * N(-d_3)$$

where;

$$d_3 = [\log(S/L) / \sigma\sqrt{t}] + [\sigma\sqrt{t}/2]$$

$$d_4 = [\log\{(L * L) / (S * K)\} / \sigma\sqrt{t}] + [\sigma\sqrt{t}/2]$$

$N(x)$  = value of the standard normal distribution for x.

As discussed earlier,  $V_c$  and  $V_p$  should be equal in the interest of equity and justice. As an example, Obaidullah initially assumes that the current market price (S) is 100, the exercise price (K) is 120, the upper bound (H) is 150, the lower bound (L) is 90 and the volatility measure is 0.25. Given this Obaidullah computes  $V_c$  to be 6.57 and  $V_p$  to be 21.63. Thus, there is a wide difference between the option values and the contract happens to be in favor of the client. When the upper bound is decreased to 125,  $V_c$  increases

to 11.96, the difference diminishes. As such, when the lower bound is decreased to 75,  $V_p$  reduces to 12.69. And finally  $V_p$  becomes equal to  $V_c$  when the lower bound is further decreased to  $\sim 74$ .

When the deal is structured by the client, he may prefer to fix the upper bound in favor of himself, taking into account the price risk that he is willing to bear. As mentioned above, lower the upper bound, the lower is the price risk and lower the upper bound, higher would be the  $V_c$ . The equality condition would demand that  $V_p$  must be also higher.  $V_p$  would be higher only when the lower bound is higher, given the values of other parameters. And in result, price risk to the bank would also be lower. Conclusively, Obaidullah notes that “For every value of the upper bound, there would be a corresponding lower bound where equity is ensured.”

Now let us compare Obaidullah’s results with a conventional option pricing method and try to find out in which upper and lower bound levels we will find the same option value as the ones that Obaidullah found using the European pricing method.

As we seen above, Obaidullah found the values of the options of the both parties as 11.96 via iteration to find the equal price for both of the parties but not the according price to the market. So we will do the same and try to find the same option value in a conventional barrier option. Actually we will price and compare two barrier options, one is an Up an in Call,  $V_c$  and the other is a Down and in Put,  $V_p$ .

As we know the longer the maturity is the higher the option’s price will go. So we can try to find the equilibrium point for these two options in any given maturity. But we are not trying to find the according market price but the equal valued lower and upper bound levels for these two options. So we will assume a maturity date (3.54431) which will make our  $V_c$  result to be equal to Obaidullah’s result ( $V_c=11.96$ ) with same upper bound (125) and



try to find out the correct lower bound which will give the same value for  $V_p$  with the same assumptions.

We are trying to find the correct lower bound to give us the result of  $V_p = V_c = 11.96$ ;

We will assume the maturity to be 3.54431

Volatility: 0.25

Current Market Price: 100

Strike Price: 120

After several iterations we found the lower bound to make the Down and In Put option's value to be 11.96 and equal to the  $V_c$  as;

Lower Bound: 47.71737

As you can remember the lower bound of the Khīyar al-Shart was ~74. It seems that as far as conventional pricing method concerns the Down and In Put with the same lower bound as the Khīyar al-Shart is more valuable.

We needed to lower it in a significant degree (conventional method's lower bound of 47.71737 for Khīyar al-Shart's lower bound of ~74) to make their value equal at 11.96.

It should be inferred as due to the averaging process of the volatility for the Khīyar al-Shart as mentioned above. Obaidullah indicates this as; at the end of 1 year the volatility of Khīyar al-Shart implies as %57.85 of the corresponding European option volatility. So we see that here too but in a much more accelerated rate compared to our assumed maturity date. If we reduce volatility and try to imitate the volatility behavior in average asset pricing we can find 11.96 with higher lower bound levels. As a result we can find 11.96 with a lower bound of 74 with a volatility of 0.1314198 which is % 52.56792 of the volatility of 0.25 as Obaidullah assumed in the valuation of Khīyar al-Shart.

### **5.4.2 ‘Urbun (Down-Payment Sale)**

‘*Urbun* (down-payment sale) can be defined as where a person buys an item from a potential buyer and makes some portion of the payment only and further gaining right whether or not to buy the item at its full price. It is known that in *urbun* sale when the buyer decides to execute the full sale, the down- payment or ‘*urbun* will be considered as a part of the full sale. If a buyer decides not to execute the sale then it is considered as a gift to seller.

This arrangement between a potential buyer and a potential seller is considered similar to a call option within contemporary jurists (scholars who are studied in the principles of Islamic jurisprudence) and Islamic financial practitioners since buyer has the option not to buy whereas the agreement is binding for seller.

While most of the contemporary jurists and classical jurists deem naked options as unlawful in Islam (as mentioned in above sections of this thesis) they also think that embedded options as this one (‘*urbun*) should be accordingly compensated. Moreover they think that the seller only compensated if the buyer does not decide to buy the product and even then this compensation might not be enough for the time the seller had to wait for the buyer to make his decision.

Conclusively, by a prestigious international juristic body, Fiqh Academy of the Organization of Islamic Conference, down-payment sales were deemed permissible since 1993.

#### **5.4.2.1 ‘Urbun as a Call Option**

There are obvious juristic and legal differences between an ‘*urbun* and a contemporary call option. In the contemporary call option buyer pays a premium for this right. Some institutions on the other hand ignore the differences between those two contracts and use both contemporary call

option and '*urbun*, under the Arabic name. Let us say, a seller wants to write a call option and give potential buyer right to purchase an item in specified time at a strike price of 100, the seller then receives a premium of  $p$  from buyer. At the end of the option period if the buyer decides to exercise his options he simply pays 100 and the total gain of the seller would be  $p+100$ .

However, in '*urbun*  $p$  would be counted toward the total price and total gain of the seller would be only 100 ( $=p+100-p$ ). In this regard, one may add  $p$  to the agreed upon price rise it to  $p+100$  and if the buyer decides to make the purchase then the total gain of the '*urbun* seller would be  $p+100$  ( $=p+100+p-p$ ).

#### **5.4.2.2 Case Study 1 on '*Urbun*: *Al-Ahli* International Secured Fund**

A protected principal fund was started by National Commercial Bank (NCB) of Saudi Arabia in 2000. Derivative strategies were used within the fund without having to trade in options explicitly.

The goal of the fund was to make capital gains at various participation rates (e.g., 37.5 percent of underlying index and 11 percent of capitalization rate (it is the ratio between the NOI (net operating income) produced by an asset (or in this case a fund) and its capital cost (the original price paid to buy the asset) or alternatively its current market value.) which depends on the investor's subscription date) in a weighted basket of global equities that are *Shari'a* compliant.

As the name suggests the fund was principal protected. NCB did not guarantee the principals, instead it just declared that it would be protected because giving returns while guaranteeing the principal would be deemed *riba* (interest and thus unlawful in Islam) by most jurists.

The plan for generating the desired return consisted of a two-year process. In the plan at first year, closed-end *murabaha* (financing of a commodity at a cost plus profit margin) fund (Securitized *Murabahas*) provided customers with fixed returns. In this first year the investors were bear the credit risk only and the fund did not directly guarantee the principal.

In its second year, the bank uses 5 percent of the original capital, the profits gained in the first year's *murabaha* investment and the anticipated profits from the second year's *murabaha* investment for investing in a call option and this is called '*urbun* in Arabic name as described above. So 95 percent of the original capital is still protected and kept in the *murabaha* fund.

The call options are only exercised if the index increases in the value. So that investor receives a gross return. This gross return is equal to the maximum of return that calculated based on the participation rate in the index that they invested in and the capitalization rate for their particular subscription date.

The product was structured and the indexed portfolio of stocks was managed by an investment bank which has been chosen as an advisor. That investment bank received a "performance fee" which was equal to the returns above the capitalization rate on the portfolio. In fact, this fee, itself, was a call option on the according participation rate with a strike price of "the index value at the beginning of the first year" plus "the profits to the capitalization rate".

Then the advisor, conventional investment bank, conveniently sells this call option to make it a flat fee and gets itself rid of the risk of this option (shown in the left panel of Exhibit 2).

So, payoff of this two year arrangement for fund investors looked like a bullish spread, where principal protected at 100%, and with a participation

rate of 37.5% of index capital gains, with a capitalization rate of 11% (shown in the right panel of Exhibit 2). Note that NCB's own management fee which then set at 1.5% of total assets is ignored here.

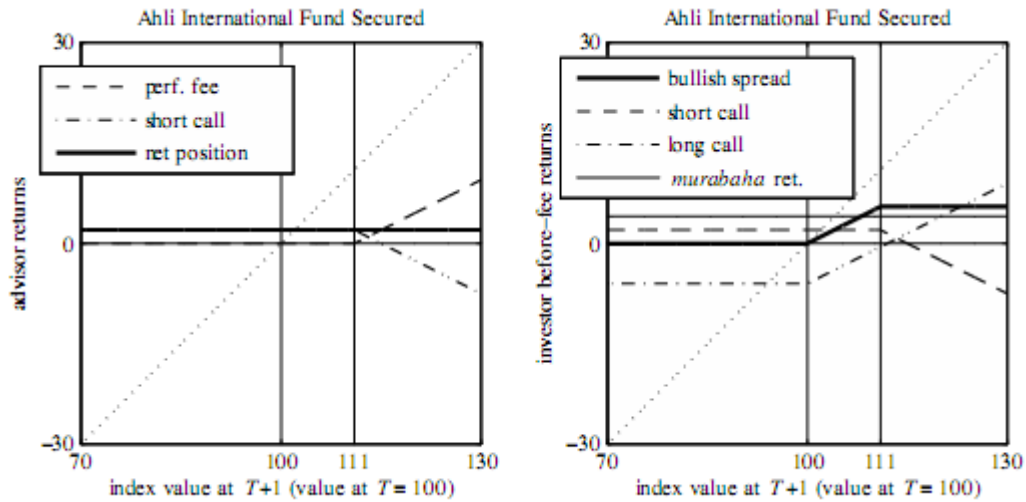


Exhibit 2: Al-Ahli Secured Fund Returns

(El-Gamal, M. A. 2006, *Islamic Finance; Law, Economics, and Practice*, Cambridge University Press.)

Normally a bullish spread could easily be structured by buying a call option at the defined protection level (100 in the exhibit 2) and selling a call option at the capitalization level (111 in the exhibit 2).

But in this case, the long call position was manufactured through buying a call option in the form of 'urbun' purchase (purchase with down-payment) of their participation position in the index capital gains with the profits of the first year's *murabaha* investment plus the anticipated profits from the second year's *murabaha* investment.

To generate the short call position was more difficult for the fund because they would not be able to write a call option in the form of an 'urbun' on an asset (the participation position in the index capital gains) they do not actually own. To be able to sell this participation position in the form of an

*'urbun*, investors would have to exercise their option and actually take the possession of the participation position in the index.

However, by configuring and writing the call option as a gift (performance fee) to the “advisor”, the NBC took the short call position without engaging in options trading. Then as we saw above the advisor (Conventional Investment Bank) sell the long call he receives and collects its fees. Not engaging in options (naked options) trading was essential for NBC because *Fiqh* Academy of the Organization of Islamic Conference and other widely prestigious juristic councils has not (yet) approved this transaction.

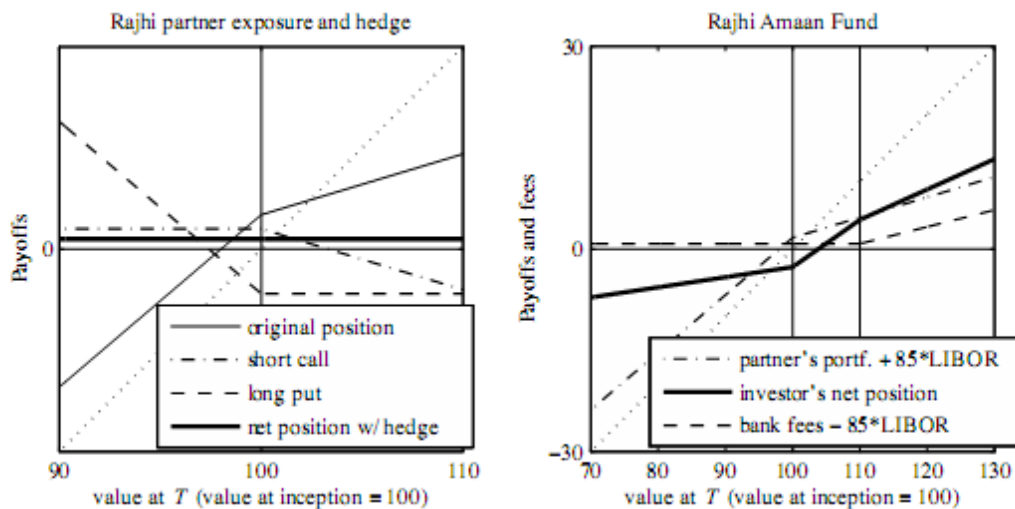
#### **5.4.2.3 Case Study 2 on ‘*Urbun*: Al-Rajhi Aman Fund**

Providing principle protection does not necessarily need *'urbun*. *Al-Rajhi*'s Aman-1 Fund, which was introduced roughly at the same time with the NCB's *Al-Ahli* International Secured Fund, showed us that. *Al-Rajhi* did not want to get into the argument about the difference between “protected principle” and “guaranteed principle” which would increase the suspicions of *riba* among investors. Instead *Al-Rajhi* provided partial protection of principle so it eased these suspicions in a rather easy way.

Moreover, unlike *Al-Ahli* International Secured Fund, *Al-Rajhi* did not use options as payment to its partner (instead of the advisor in NCB's fund). Instead, this fund was equipped with options which could be traded by the “partner” who is again a Conventional Investment Bank. The “partner” was in the partnership by owning an uncertain share of the fund portfolio without owning any shares in the mutual fund so it did not have to abide by the *Shari'a*. So *Al-Rajhi* (Islamic Financial Provider in this case) fund benefitted from options without implicating itself in direct options trading.

The fund sold the 85% of the portfolio to the partner with a deferred payment (deferred payment's profits are not perceived as *riba*) so the profits

coming from here would not have been *riba*. In *Shari'a*, profits from a partnership can be shared at any agreed upon rate but losses have to be shared according to the participation percentage. So in this case, the partner was to gain 30% of profits, which was the agreed upon rate, while it is exposed to the 85% of the losses.



*Exhibit 3: Al-Rajhi's Aman-1 Fund*

*(El-Gamal, M. A. 2006, Islamic Finance; Law, Economics, and Practice, Cambridge University Press.)*

Then of course the partner converted this risky position into a flat fee just as it happened in the NCB's *Al-Ahli* International Secured Fund. It sold a call and gave up the 30% of gains and bought a put and saved itself from the 85% of losses (left panel of Exhibit 3). By this arrangement, the fund's investors' risk was significantly decreased (right panel of Exhibit 3) and they did not directly trade with options.

In the case of both examples NCB and *Al-Rajhi*, we can see that investors are isolated from options trading with the use of advisors/partners. As explained above this process can be summarized as Islamic providers of the fund are not trading in derivatives but the conventional investment banks are trading in derivatives instead of them.

However, although the use of conventional Investment Banks (advisors/partners) as buffers in derivatives trading is economically beneficial because of their expertise and advantages in the area, one may argue that these structures are being used as a means of exploiting *Shari'a* arbitrage opportunities, hence they are fundamentally unlawful in Islamic Finance.

#### **5.4.3 The Use of Options in Kuveyt Turk Participation Bank**

In Turkey, from the end of 2010 to September 2011, the amount of currency swaps, interest rate swaps, currency options and currency forwards have shown an increase of 52.73% while other derivatives have grown only as 28.30%.

The derivative positions of Turkish Banks are increasing accordingly with their growth in total assets. Their total derivatives positions have been grown to 302.22 Billion TL showing an increase of 53.70% in last year.

As of September 2011 the growth of main derivatives from the year end of 2010 are as;

Interest Rate Swaps: 80.43 % to 62.68 Billion TL

Currency Forwards: 80.03 % to 45.61 Billion TL

Currency Options: 66.69 % to 57.28 Billion TL

The industry has seen a 2 Billion TL profit in the 3<sup>rd</sup> quarter of 2011 from the capital market transactions and 692 Million TL of it came from the derivatives. The profit composition of the derivatives seems to be changes in that quarter.

The industry profited from the hedging derivatives for the first time since the second quarter of 2009. The 53.2% of the total derivative profits were from the ones that made for hedging reasons. The most profitable one was



the currency forwards. Nevertheless, currency options, currency swaps and interest rate forwards were profitable too, as you can see in the table below.

(Million TL)*	Dec 2010	Mar 2011	Jan 2011	Sep 2011
Foreign Currency Forwards	579	213	428	595
Interest Rate Forwards	4	-3	-1	51
Currency Swaps	-1.745	148	124	246
Interest Rate Swaps	-1.572	-130	-309	-773
Credit Default Swaps	-7	-3	-7	-45
Currency Futures	6	1	0	-5
Interest Rate Futures	-9	3	1	0
Currency Options (i.e. DCD: Dual Currency Deposits)	233	-17	114	283
Interest Rate Options	15	6	8	-6
*Total of profits from Hedging and Profit aimed transactions				

As it can be seen from these statistics currency options have big potential and intent to grow in the market. Conventional Banks in Turkey are trying to utilize this opportunity as you can see from the information above but Participation Banks have not yet been a player in this game so the statistics about the currency options above are only about the Conventional Banks in Turkey.

Be that as it may, Kuveyt Türk Participation Bank, making its research and development about DCD's lately and arrived a solution of it's own about the permissibility of DCD (Dual Currency Deposit, a currency option) and created it's own option pricing infrastructure.

Let us see what Kuveyt Türk has come up with on Sheri'a permissible DCD's;

#### **5.4.3.1 Protected Participation Account**

As a first among the participation Banks in Turkey, Kuveyt Türk Participation Bank's (KT) constructed a product which is for customers who want to generate profits from their savings accounts while hedging themselves against currency fluctuations to protect or increase income. Protected participation account is a type of derivative which is based on

deposited savings and currency option of an investor. By holding this account customer would keep its savings protected (\$, €, TL) and have the right to exercise currency option at maturity.

Once participation account is funded by customer, an option with a maturity date is sold by the bank to customer. In this way, customer will have a dual currency deposit (DCD). At the maturity, customer will have the right to exercise this option and exchange deposited savings including profits for a specific currency at a pre-determined rate.

Customer will not pay an option premium upfront to the bank for having this option. Instead of paying option premium, customer will give up the contribution rate in the deposit pool and consequently the bank's contribution rate will increase. For instance, if a customer has a silver account, which is a type of participation account where the contribution rates (profit sharing percentages) are e.g. 80% for customer and 20% for the bank, they will give up some portion of the contribution rate.

KT calculates the size of the option according to the profits rates of the contract day and the amount of money the customer deposited. Then KT calculates the volatility and the strike price according to the size of the option and the premium in the form of reduced participation rate that was given up by the customer. Following this, the bank sells the option to customer, with these calculated parameters at the same maturity date as participation account.

If the money deposited in the saving account is the base currency (USD) then the option sold will be a put option. In this case customer has the right to sell USD at a strike price at maturity date. If saving account is pair currency (TL), then the option sold will be a call option. In this case customer has the right to buy USD at a strike price at maturity date.

Briefly, the customer buys a call option if she/he deposited a pair currency or buys a put option if she/he deposited the base currency by paying the premium in the form of a reduced participation percentage on the profits of the account.

<b>20 PROTECTED</b> <b>(for Silver account: 80% Customer – 20% Bank)</b>	
<b>Profit Ratio Of Customer</b>	20%
<b>Premium</b>	60%
<b>Option Size</b>	Deposited Savings + 20%

<b>40 PROTECTED</b> <b>(for Silver account: 80% Customer – 20% Bank)</b>	
<b>Profit Ratio Of Customer</b>	40%
<b>Premium</b>	40%
<b>Option Size</b>	Deposited Savings + 40%

*Table 3: Premium / Profit Ratios in KT's DCDs*

#### **5.4.3.2 Profitable Participation Account**

The difference between profitable and protected participation accounts is that in the profitable participation account it is the bank instead of customer who give up some portion of its profit ratio. The bank gives up its profit rate of 20% on the participation account; this rate however varies for different account types (i.e. Silver account: 80% customer – 20% bank). In this case, customer bares the risk and sells the option. In the profitable participation account, customer sells the right to exercise the option whereas in the protected participation account, customer buys right to exercise the option.

The deposited savings plus the profits she/he will receive will constitute the option size. While the 20% profit rate that bank has given up will be

considered as the premium. So the bank buys the option at the calculated volatility and the strike price according to the parameters. Finally, it will be the bank that decides whether to exercise the option or not at the maturity date.

Briefly, the customer sells a call option to the bank if she/he deposited a base currency or sells a put option if she/he deposited a pair currency by receiving the premium in the form of an increased participation percentage on the profits of the account. Note that customer buys right to exercise the option by protected savings account whereas by profitable account, customer sells right to exercise the call option.

<b>Deposited Currency / Target Currency</b>	<b>Protected (Holder Of The Right is Customer)</b>	<b>Profitable (Holder Of The Right is Bank)</b>
TL / USD	CALL	PUT
USD / TL	PUT	CALL

*Table 4: Option Types for the According Deposit Accounts*

Although Kuveyt Türk’s system is not open for sale yet, we can try and compare it to the T.C. Garanti Bank’s DCD. As we saw above Kuveyt Türk is implementing DCD as both protected and profitable versions but Garanti Bank is serving it’s more interesting version which is profitable DCD.

Lets see how Garanti’s version work first;

On their website they have an example of their DCD which is;

*“Transaction Amount: USD 100.000*

*If at a given date, USD/TL exchange rate is 1,6000 (spot price), and at the end of 1 month if you think that the exchange rate will not go above 1,6500 (exercise price), or even if it does you find it acceptable to convert your USD 100.000 to TL at an exchange rate of 1,6500, you can sell the right to buy your USD 100.000 at 1,6500 to our Bank. In exchange for this right, you can earn an annual net amount of deposit interest and options premium in USD.*

***Term: 31 days (1 month)***

***Spot Price: 1,6000***

***Exercise Price: 1,6500***

***Options premium + Deposit Interest: 15% (Annual and Net)***

***At the maturity date: At the end of 1 month, at 14:00, the USD/TL exchange rate is taken into account.***

***If the USD/TL exchange rate is below the exercise price (1,6500); The Bank does not exercise the option right and along with USD 100.000 (principal),  $100.000 \times 31 \times 15 / 3600 = \text{USD } 1.274$  is credited to your account as payment for premium and deposit interest.***

***If the USD/TL exchange rate is at the exercise price (1,6500) or higher; The Bank exercises the option right and along with  $100.000 \times 1,6500 = \text{TL } 165.000$ , USD 1.274 is credited to your account as payment for premium and deposit interest.”*** (<http://www.garanti.com.tr/tr/kobi/yatirim/dcd.page>)

As you know we cannot really compare Garanti's implementation and Kuveyt Türk's implementation because Kuveyt Türk cannot utter any future gains.

Instead Kuveyt Türk negotiates on the future price of the USD.

<b>Tutar Bilgileri</b> Katılma Döviz Cinsi: USD Karşı Döviz Cinsi: TL Alınacak Tutar: 100.000,00 USD		<b>Alınacak Hesap</b> Merkez Şube: 101-USD Deniz Ceyda:		<b>Karşı Hesap</b> Merkez Şube: 1-TL Deniz Ceyda:	
<b>Ürün ve Vade Bilgileri</b> Ürün: Kırık Karlı - %100 Karlı Başlangıç Tarihi: 22.12.2011 Vade Tarihi: 23.01.2012 Katılma Vadesi: 31		<b>Stopaj Hesabı</b> Merkez Şube: 1-TL Deniz Ceyda:			
<b>Kur Bilgileri</b> Spot Kur: 1,50264 Vadeil Kur: 1,63398		<b>Vade Sonu Bilgileri</b> Gün Sonu Saati: 14:00 Bildirim Şekli: Yok Otomatik Realizasyon: <input type="checkbox"/>			

As you can see in the picture above, Kuveyt Türk produces the future value of USD according to the given parameters and tells it to its customer. If the customer is willing to sell 100,000 USD for 1.63398 31 days from now she/he can deposit her/his money in Kuveyt Türk profitable account. After 31 days, she/he will receive the gain which is higher than a basic deposit account's gains due to the option premium that bank gave her/him as an increased sharing percentages as explained above parts of this chapter. It would be beneficial to remember that in participation banking in any circumstances a customer cannot be told the amount she/he will receive beforehand because it is not known to anyone. It is the same for a normal deposit account so it applies to Kuveyt Türk's DCD too.

Kuveyt Türk has not yet begun marketing this product but when it begins KT will need to hedge itself against risks of these DCD's. KT simply puts that "we will either solve the hedging problem with dynamic delta hedging or we will make the opposite transaction with the banks that have the same product as us which are UBS and Deutsche Bank. They also began marketing these Shariah Compatible DCD's approximately in mid 2010. KT also adds that "We were ready at that time but we are waiting for our big owner's (Kuveyt Finance House) approval to begin marketing".

## 6. CONCLUSION

At the end we can summarize the Islamic Options as “Khiyar al-Shart”, “‘Urbun” and the Kuveyt Türk’s application which are the most feasible ones and comparable to the conventional options. Between these three Islamic Option versions, there are differences and similarities with both themselves and conventional options. Let us see these similarities and differences in a table so we can comprehend them easier.

	Conventional Options	Islamic Options		
		Khiyar al-Shart	‘Urbun	Kuveyt Türk's Options
Option	Given to the buyer	Given to the both parties	Given to the buyer	Given to the buyer
Maturity	Predetermind	Predetermind	Predetermind	Predetermind
Option Pricing	Marked to Market	Made to be sure that both parties' options have the same value	Marked to Market	Marked to Market
Option Premium	Paid Upfront	Paid at the maturity	Paid Upfront	Paid by giving up the total or part of your gains
Premium Payment	Seperate from the price should be paid at the maturity to buy the underlying	As a part of the price should be paid at the maturity to buy the underlying	As a part of the price should be paid at the maturity to buy the underlying	Seperate from the price should be paid at the maturity to buy the underlying

As you can see the three Islamic Options are not the same. While Kuveyt Türk uses the permissibility of giving up the gain of one part the other two uses the permissibility of being a part of the actual price.

Note that, while Khiyar al-Shart and ‘Urbun needs certain conditions to be feasible, Kuveyt Türk’s version is viable for almost all conditions of options unless it is being speculative.

So, it seems economically, the way that Kuveyt Türk has found to collect the fee separately but permissibly is much more feasible than the others. On the other hand one needs her/his own option pricing program that can calculate and discount the necessary option fees from the gains or fees of the financial transaction that used as underlying.

As we saw, options in Participation Banking try to imitate the results of their conventional counterparts. Doing this not an easy task for those players in Islamic Banking because they have to deal (or abide by) with Shari’a rules as well as the competitive environment of modern economics and rules of modern law.

Trying to achieve same economic results from financial transactions (often complex ones of course), often results in surprising similarities between conventional options and Islamic (mostly embedded) options. Of course these similarities arise some concerns about Islamic Permissibility of such transaction among Islamic Investors but given the circumstances pro side of these kind of financial instrument which uses embedded options seems like more than the con side.

It is not only the permissibility issue that makes Islamic Options scarce but lack of financial debt of demand for this kind of product makes them rare too. As we saw in some cases, financial embedded options are used for hedging the investors’ risk on a fund portfolio but for small firms or for individuals it seems it is still early to find some permissible options embedded financial product to conduct. On that matter, small steps like Kuveyt Türk has been taking lately, contributes a lot in this niche market.



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