

# Modeling Salam Contract for Profit and Loss Sharing

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**Abstract**—Profit and loss sharing suggests an equitable sharing of risks and profits between the parts involved in a financial transaction. Salam is a contract in which advance payment is made for goods to be delivered at a future date. The purpose of this work is to price a new contract for profit and loss sharing based on Salam contract, using Khiyar Al Ghabn which is an agreement of choice in case of misrepresent facts.

**Keywords**—Islamic finance, Shariah compliance, profit and loss sharing, derivatives, risks, hedging, salam contract.

## I. INTRODUCTION

THE profit and loss sharing can avoid unlimited risk which is undesirable and unknown loss for all parts of the contract.

In Islamic finance, the risk can be seen as Gharar<sup>1</sup> meaning the unknown which is not allowed [22].

In previous works, models are priced to minimize the risk, such as Waad Bil Mourabaha [1] Shariah Compliant alternative to the European Call option and Participating Contingent Premium Options [2] where the principle of profit and loss sharing is used. In both works, the risk of the seller is unlimited.

According to [5]-[7], the risk in Islamic finance must be tolerable it means it is inevitable, insignificant and unintentional. If the execution of the contract is under the control of one of the parts, the loss can be caused to the other intentionally. This issue is resolved by the payment of the premium. Several other studies about risk and hedging in Islamic finance have been made [20], [21], [24], [25] but most of them kept the premium.

Salam is a contract for deferred delivery that was originally sanctioned during the time of the Prophet, peace be upon him, to facilitate the trading activities of farmers who were awaiting the harvest of crops. In more modern times, it has also been applied to the production of raw materials and fungible goods in general. In Sudan, Salam contract was used in the field of agriculture, this is a contract that has been very useful but that has experienced the stress of the price variation. Despite the fact is that the prices of goods sold by the Salam contract are set by the state price but changes due left disgruntled farmers. In order to avoid these problems, many solutions have been proposed by Sudan's bank [4], [12], [29].

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<sup>1</sup>An Islamic finance term describing a risky or hazardous sale, where details concerning the sale item are unknown or uncertain.

If prices change much and farmers felt injustice, the bank can negotiate the difference of price. If this additional amount did not satisfy farmers, the Salam contract can be cancelled and the good returned back to be sold on the market. The latter possibility can be considered as khiyar Shart which is an option that constitutes a condition stipulated in the contract, this option confers on the parties to the contract the right to proceed with contract by confirming it or to cancel it all within a pre-agreed period of time. The use of khiyar Shart is controversial by Shariah<sup>2</sup> in the Salam contract.

In our study, we will learn from the experience of Sudan to Model modified Salam Contract. The additional amount will be calculated using the principle of profit and loss sharing and the payment will be based on Khiyar Al Ghabn [4].

The remainder of this paper is as follows: The next section introduces Salam contract; Section III includes the new approach to Salam contract and presents the simulation results; Section IV explains the second case of the model in which the cancellation is avoided; and Section V summarizes the finding and gives conclusions.

## II. SALAM CONTRACT

In the scientific literature, the Salam Contract can be defined by many ways. According to [30] and [16], the word "Salam" is synonymous to the word "Sala" which means the lending. According to [9] and [13], Salam is a contract where two parties enter into a contract of sale of goods which would be delivered in future for which the price for the goods would be paid in cash on spot at the time of the signing of the contract. The Salam Contract can be also seen as an analogous contract to derivatives like sales, as represented in [15] where authors define the Salam Contract as prepaid forward sale. Article [8] explains the agreement of the four Madhahib<sup>3</sup> about the Salam contract and resumes their perception of the application of the contract.

## III. NEW APPROACH TO MODEL SALAM FOR PROFIT AND LOSS SHARING

Here, we present the new approach to model Salam contract. First, we give the expression of the capitalization and the reduced price of the good. Then, we remind the formula of the profit and loss sharing to calculate the expression of profit and loss sharing of the Salam contract. And finally, we present the interval of the execution of the contract.

In this study, we will use the following data:

- T: The time variable
- S<sub>0</sub>: The price of good at t=0
- S<sub>t</sub>: The price of good at maturity T=t

<sup>2</sup> Islamic law

<sup>3</sup>Schools of Islamic law: Maliki, Hanafi, Hanbali, Chafii.

- $t$ : The maturity
- $R$ : The dynamic rate per period of return of good
- $r$ : The cumulative rate of reduction for the time of maturity
- $PF$ : The expected future price of good calculated using the formula of actualization
- $Pr$ : The reduced price of the good
- $\delta$ : The variation of the price of good
- $\rho$ : The percentage of the variation of the price of good
- $P'$ : The amount to be exchanged according to the principle of profit and loss sharing
- $p$ : The percentage of tolerance of price's variation
- $[IEC]$ : The interval of execution of the contract
- $\beta$ : Function that takes 0 or 1
- $P\{ms\}$ : Modified Salam contract

#### A. The Future and the Reduced Price of Good

Using the classical formula of actualization represented in article [10], the formula of the future price of the good  $P F$  is given by:

$$PF = S_0 * (1 + R)^t \quad (1)$$

It represents the expected value of the good at maturity.

According to [3], [18], [26], [28] the price of the Salam must include a reduction since the whole amount is paid spot at the beginning.

To apply this condition, we use the rate of reduction and (1) to give the formula of the reduced price of the good:

$$Pr = PF * (1 - r) \quad (2)$$

$Pr$  is the price paid by the buyer at the time of signing the contract to receive the good at maturity.

#### B. Khiyar al Ghabn

The price of the good at maturity is not controlled, it can fluctuate much causing loss for each part of the Salam contract. According to [19], [23], [27] this loss can be seen as Ghabn or Ghobn<sup>4</sup> where one of the parties' mind that the price paid is not adequat. In this case, it can be possible to avoid the Ghabn by an agreed amount, which can be difficult and can occasion conflict. The other possibility is to add in the considered contract a stipulation of Khiyar<sup>5</sup> al Ghabn.

Khiyar Al Ghabn includes the payment of an additional amount considering the experience of Sudan it can also include the cancellation of the contract; this solution is seen as Khiyar Al Shart.

In the following, we present a modeling of Khiyar Al Ghabn based on the principle of profit and loss sharing.

In [10], for the pricing of Al Arboun, authors supposed that the rate of return is constant. In this paper, we propose to compute the price of good's purchase and the variable rate of return.

<sup>4</sup>Arabic word meaning literally to do wrong, cheat or misrepresent facts, resulting in injustice and possibly substantial deviation from market price

<sup>5</sup> Arabic word meaning choice

#### 1. Principle of Profit and Loss SHARING

In [2], the Participating Contingent Premium Option (PCPO) is modeled which is based on profit and loss sharing. In the following, we remind the expression of some equations used in that work.

$P'\{pcpo\}$  is the amount that will be paid by the buyer under respecting principles of profit and loss sharing:

$$P'\{pcpo\} = \rho\{pcpo\} * \delta\{pcpo\} \quad (3)$$

where  $\delta\{pcpo\}$  is the variation of the price of good between the expected price of the good at maturity  $P\{pcpo\}$ , and the real price of the good at maturity  $St$ , given by:

$$\delta\{pcpo\} = |St - P\{pcpo\}| \quad (4)$$

and  $\rho\{pcpo\}$  is the percentage of the variation:

$$\rho\{pcpo\} = \frac{|St - P\{pcpo\}|}{P\{pcpo\}} \quad (5)$$

We notice the use of only positive values.

We considered that the amount  $P'\{pcpo\}$  is only paid by the buyer because he has the control on the execution of the contract.

In this work, we assume that the buyer and the seller have the same control on the execution of the contract and we will consider the possibility of exchanging money. To permit this possibility, we use (4) of the variation of price of good, we remove the absolute value and we substitute the price of purchase of good  $P\{pcpo\}$  by the reduced price of the good  $Pr$ . The expression of the variation becomes:

$$\delta = St - Pr \quad (6)$$

$Pr$  is the reduced price of the good calculated at  $T=0$  and paid at the time of signing the contract to receive the agreed quantity of good according to the classical Salam contract.  $St$  is the price of the good at maturity.

The expression of  $\delta$  explains the difference between Salam sale and ordinary sale. In the Salam sale, the price  $Pr$  is paid at  $T=0$  to receive the good at maturity. In the ordinary sale, the buyer pays the price  $St$  and receives the good at the same time.

TABLE I  
PROFIT AND LOSS OF MODIFIED SALAM CONTRACT

Cases	Value of Underlying Asset	PL of the Buyer	PL of the Seller
Case1	$St < Pr * (1-p)$	0	0
Case2	$Pr * (1-p) \leq St < Pr$	$Pr - St < 0$	$St - Pr > 0$
Case3	$St = Pr$	$Pr - St = 0$	$St - Pr = 0$
Case4	$Pr < St \leq Pr * (1+p)$	$Pr - St > 0$	$St - Pr < 0$
Case5	$St > Pr * (1+p)$	0	0

For the seller, the expression of  $\delta$  permits to quantify the difference of gain between the Salam and the ordinary sale.

Using (5), we substitute the price of purchase of good  $P\{pcpo\}$  by the reduced price of good  $Pr$ , to give the expression of the percentage of the variation of the price:

$$\rho = \frac{|S_t - P_r|}{P_r} \quad (7)$$

Using (3), (6) and (7), we give the expression of the  $P'$  the amount to be exchanged according to the principle of profit and loss sharing:

$$P' = \rho * \delta \quad (8)$$

The amount  $P'$  is paid by the buyer at maturity, if the price of the good is inside the agreed interval. This quantity can be positive, negative, or null, if it is positive the seller receives the amount from the buyer, if it is negative the buyer receives the amount from the seller, and if it is null no amount is exchanged.

## 2. Determination of the Interval of Execution of the Contract

In [2], the interval of the execution of the contract is determined by maximizing the profit of the buyer and minimizing his loss. If at maturity, the prices do not permit to the buyer to make profit, the contract is cancelled. The interval is controlled by the buyer.

In this work, we are interested in profit and loss sharing equally between the buyer and the seller, both parts controls the execution of the contract. According to [14], the cancelling of the Salam contract can be possible only if both parts agreed. To express this idea, we introduce the percentage of tolerance of price's variation  $p$  which is determined by the agreement at the beginning.

The interval of execution of the contract can be given as:

$$[IEC] = [Pr*(1-p_1) ; Pr*(1+p_2)] \quad (9)$$

where  $p_1$  is the tolerance rate of the lower bound and  $p_2$  is the tolerance of the upper bound.

In the following, we consider  $p_1 = p_2 = p$ .

### C. Model of Modified Salam for Profit and Loss Sharing

Using (1), (8) and (9) we define modified Salam price contract:

$$P\{ms\} = \beta\{[IEC]\} * [Pr + P'\{[IEC]\}] \quad (10)$$

If at maturity, the price of the good fluctuated outside the interval of the execution of the contract the parameter  $\beta\{[IEC]\}$  takes the value 0 and the contract is automatically cancelled. In that case, we can calculate the modified Salam price contract  $P\{ms\} = 0$ , there is no payment for the cancelling. If the price of the good at maturity is inside the interval  $[IEC]$  the parameter  $\beta\{[IEC]\}$  takes the value 1 the additional amount  $P'$  is calculated according to the price of the good at maturity  $S_t$ , and the good is delivered.

## D. Table of Profit and Loss

### 1. Numerical Results

In the following examples, we consider the price of good at  $t=0$  is  $S_0 = 100$  DH and the maturity is  $t = 3$  years. The parameters  $PF$ ,  $Pr$ ,  $\delta$ ,  $\rho$ ,  $P'$ , and  $P\{ms\}$  are calculated respectively using (1), (2), (6), (7), (8) and (10), and the interval  $[IEC]$  is calculated using (9). The percentage of the tolerance  $p = 10\%$ . The percentage of reduction is the Moroccan inflation rate  $r=0,017$ , we consider that this rate is constant between  $T=0$  and  $T=t$ . We will propose two possibilities of computation of the rate of return.

- Case 1: The rate of return is calculated using the modified Black and Scholes Model represented in [1], with the volatility  $\sigma = 0,3$ . We obtain  $R1 = 0,0317$ .
- Case 2: The net rate of return of the Islamic Central Bank of Malaysia according to the Framework of Rate of Return [17],  $R2 = 0,0437$ .

The rate of return can also be computed using chronological series as in [11].

*Example 1:  $S_t = 100$  DH*

TABLE II  
ST<PR THE DIFFERENCE WILL BE PAID BY THE SELLER

Parameters	Case1(R1)	Case2(R2)
PF	109,814	113,6912
Pr	107,9422	111,7585
[IEC]	[97,1480;118,7364]	[100,5826;122,9343]
$\delta$	-7,9422	-11,7585
P	0,0735	0,105
P'	-0,5844	-1,2372
P{ms}	107,3579	110,5213

*Example 2:  $S_t = Pr = 107,9422$  DH*

TABLE III  
ST > P R THE DIFFERENCE WILL BE PAID BY THE BUYER, BUT IN CASE 1  
ST = PR THERE IS NO PROFIT AND LOSS SHARING AMOUNT EXCHANGED

Parameters	Case1(R1)	Case2(R2)
PF	109,814	113,6912
Pr	107,9422	111,7585
[IEC]	[97,1480;118,7364]	[100,5826;122,9343]
$\delta$	0	-3,8163
P	0	0,0341
P'	0	-0,1303
P{ms}	Pr = 107,9422	111,6242

*Example 3:  $S_t = 115$  DH*

TABLE IV  
ST > PR THE DIFFERENCE WILL BE PAID BY THE BUYER AS CASE 2 IN THE  
SECOND EXAMPLE

Parameters	Case1(R1)	Case2(R2)
PF	109,814	113,6912
Pr	107,9422	111,7585
[IEC]	[97,1480;118,7364]	[100,5826;122,9343]
$\delta$	7,0577	3,2414
P	0,0653	0,0290
P'	0,4615	0,094
P{ms}	108,4037	111,8525

*Example 4: St = 150 DH*

The price of good at maturity  $S_t$  is outside the interval of execution of the contract, the contract is cancelled, and the seller pays back the reduced price of the good  $P_r$ .

## IV. MODIFIED SALAM CONTRACT EXTENSION

The model of modified Salam contract includes two possibilities: the exchange of the good and the money if the price of the good at maturity is inside the interval of the execution of the contract, or in the opposite case the cancellation of the transaction without any fees.

In this section, we present an extension of the previous model supposing that the price of the good at maturity is separated into three intervals: [IEC] the interval of the execution of the contract, [Up] includes the values strictly superior to the values in [IEC], and [Down] includes the values strictly inferior to the values in [IEC]. This approach permits to limit the price of the purchase of the good without the possibility of the cancellation of the transaction, which can avoid the using of khiar Al Shart.

The model of extended modified Salam can be defined using the following equation:

$$P\{ms'\} = \beta\{[IEC]\} * [Pr + P'\{[IEC]\}] + \beta\{[Up]\} * [Pr + P'\{Pr * (1 + p)\}] + \beta\{[Down]\} * [Pr + P'\{Pr * (1 - p)\}] \quad (11)$$

$P'\{[IEC]\}$  is all the values of profit and loss sharing when the price of the good at maturity is in the interval of the execution of the contract [IEC].  $P'\{Pr * (1 + p)\}$  is the value of the profit and loss sharing of the superior border of the interval of the execution of the contract [IEC].  $P'\{Pr * (1 - p)\}$  is the value of the profit and loss sharing of the inferior border of the interval of the execution of the contract [IEC].

If the price of the good at maturity is in the interval  $[IEC]$  the profit and the loss are shared using the previous equations. Elsewhere, the price of the purchase of the good is fixed whatever is the variation, meaning in the intervals  $[Up]$  and  $[Down]$  the price to be paid is respectively  $P_r + P'_{-} \{P_r * (1 + p)\}$  and  $P_r + P'_{-} \{P_r * (1 - p)\}$ .

## V. CONCLUSION

In the traditional Salam contract, the price and the quantity of the good are fixed at the beginning. If at maturity the price of the good fluctuates, the agreed price cannot be modified which can cause loss for one part of contracting.

In this work, we presented two propositions of new approach to price Salam contract in which we use the principle of profit and loss sharing.

In the first proposition as in traditional Salam contract, the price and the quantity of the good are fixed at the beginning, and we add the possibility of Khiyar Al Ghabn calculated using the profit and loss sharing to limit the loss of both parts of the contract. We introduce also the interval of the execution of the contract which is an agreed interval of price's variation; if the agreed price of the good is outside this interval, the

contract is canceled. The use of Al Khiyar in Salam contract is controversial by Shariah, in the second proposition we model an extended model which permits to avoid the cancellation of the contract.

To improve this work we are modeling Value Based Salam contract.

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