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Derivative products and innovation in Islamic finance: A hybrid tool for risk-sharing options

Seng Kiong Kok Gianluigi Giorgioni Jason Laws

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A hybrid tool for risk-sharing options

Seng Kiong Kok
Business School, University of Wolverhampton, Wolverhampton, UK, and
Gianluigi Giorgioni and Jason Laws
Management School, University of Liverpool, Liverpool, UK

Abstract

Purpose – The purpose of this paper is to highlight the possibility of structuring an Islamic option which includes an element of risk sharing as opposed to risk transfer.

Design/methodology/approach – The approach adopted in this research involved a combination of a wa'ad (promise) and murabaha (cost plus sale) and examining if they could form a risk-sharing Islamic option. The payoffs were assumed to be dependent on bi-period outcomes.

Findings – The paper attempted to create a hybrid risk-sharing option by combining elements of both wa'ad (promise) and murabaha (cost plus sale). The results yielded are dependent on the eventual direction of the market (in-the-money, at-the-money and out-the-money). While the results are not definitive, they do provide arguments for the adoption of a risk-sharing, as opposed to a risk-transfer, methodology when it comes to structuring risk management instruments.

Research limitations/implications – One of the major limitations of this research is the inability to assess the Shariah compliance of the proposed instrument. Shariah compliance is determined by a Shariah Supervisory Board, and every effort has been made to ensure that Shariah financial principles are adhered to in the creation of this structure.

Practical implications – The structure provides some interest arguments in the creation of risk management tools under a Shariah financial framework. The structure illustrates the benefits of having a risk-sharing mode over the conventional risk-transfer stances of most risk management tools.

Originality/value – The paper offers a new way of structuring a risk management tool in Islamic finance. It explores the highly debated area of derivatives in Islamic finance and proposes a new way of creating a risk management tool that involves some elements of risk sharing.

Keywords Risk management, Derivatives, Islamic finance, Financial product design, Risk sharing

Paper type Research Paper

1. Introduction

The aim of this paper is to engineer and test the structure for a new Islamic risk management tool. The focus of many existing risk management tools would be risk transfer and this also applies to Islamic risk management tools.

This paper instead proposes a hybrid combined risk-transfer/risk-sharing product that is based on the spirit of a partnership agreement. Fundamentally, both parties (in this case the bank and the customer) actively engage in the investment and management aspects of the financial contract and share profits/losses in accordance to their proportion in the investment. The investment here is the purchase of a commodity at a future date and the product itself is a combination of a wa'ad (promise) and murabaha

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(cost plus sale). The paper will examine and test the viability of this (hybrid) structure along with proposals on pricing and aims at contributing to the literature on risk management in the context of Islamic finance.

The rationale for this paper is that the rapid growth of Islamic finance in today's global economy has highlighted some weaknesses in the financial system, with risk management being an area of emphasis from the need for further development of Islamic risk management (Wilson, 2007; Smolarski *et al.*, 2006; Maurer, 2001).

As a matter of fact, the development of risk management strategies within Islamic finance has been relatively difficult. There are various reasons for this. First, traditional Islamic risk management products were rigid (Rosly and Bakar, 2003). This was due to the constraints placed on innovators by Shariah financial law (Mohamad and Tabatabaei, 2008). Second, Ismal, (2010) and Bacha (1999) argue that this lack of development was due to lack of robust demand for risk management tools. Third, the lack of a central regulatory board has also impacted the development of risk management in Islamic finance (El-Hawary *et al.*, 2004).

The Islamic Financial Services Board and Accounting and Auditing Organisation for Islamic Financial Institutions are the two main policymakers and so-called regulatory bodies for Islamic finance, but even then these standards are only prescribed as opposed to enforced (BMB, 2010). The only country with a set of central rules for Islamic financial enterprise is Malaysia, who is seen as the most lenient and liberally open to Islamic financial policymaking. The rules of Islamic finance in the Middle East and Islamic states such as Pakistan vary from region to region and depend largely on individual religious scholars and their interpretation of the Quran. However, Askari *et al.* (2012, pp. 110-111) note that:

> […] debate on derivatives will continue in Islamic Finance, but a present they have very limited acceptability and it is unlikely that the practice of derivatives will be as widespread as seen in conventional markets any time soon. However, as Islamic finance grows, its own version of hedging mechanisms and financial products with embedded options will emerge. Prohibition of derivatives, however, does not preclude an Islamic financial intermediary from designing a risk-sharing or risk-mitigating scheme. This can be achieved through the creation of a risk-mitigating instrument synthetically using existing instruments.

As a matter of fact, over recent years, the development of Islamic risk management has progressed steadily with the creation of new Islamic risk management tools such as the wa'ad (promise) and parallel murabaha (cost plus sale) (Ebrahima and Rahmanb, 2005). The development of the wa'ad and its support within the Islamic financial community provides for an interesting picture on the progress of Islamic financial innovation (Razali, 2008; Qazi, 2012). From an Islamic financial standpoint, the wa'ad is a contractually binding promise to sell at a certain date for a specified price, a structure that is not unlike mainstream call options. The difference being, as opposed to mainstream call options, a wa'ad is legally and contractually binding, meaning that should the agreement be reneged on, legal action can be brought against the counterparty (Noor and Aripin, 2010). A wa'ad allows institutions to synthetically proxy the payoff of a standard call option. This basically enables the holder of this wa'ad to decide if the contract in question is going to be exercised. The availability of this choice, some argue (Noor and Aripin, 2010), violates the gharar requirement of Islamic finance. In trying to prevent gharar, the specifications of all contracts in Islamic finance must be agreed on prior to trading. The fact that the holder of this contract is given a choice has

created an element of uncertainty to the transaction. However, some argue that the inherent benefits of derivatives within any financial system should outweigh their detriments and in fact promote growth and liquidity transfer within the Islamic financial system (Mohammed and Tabatabaei, 2008). This new instrument clearly pushes the boundaries of Shariah compliance; however, it does show the willingness of Shariah finance to innovate and develop.

However, it should be noted that while there is increasing literature examining the legal implications of using the wa'ad as an Islamic financial tool or, in the context of this research, as a risk management instrument, the views on the permissibility of wa'ad contracts in the global Islamic financial scene are divergent at large. Examiners of the legal premises of the wa'ad contract such as Al-Masri (2002), Wisham *et al.* (2011) and Bello and Hassan (2013) have indicated that the acceptance of the wa'ad is still controversial. This inherent controversy with regards to the wa'ad structure stems from the differing interpretations of Islam from the various schools of Muslim thought (Ayub, 2011 and Ghoul, 2011). As highlighted by Firoozye (2009) in his seminal work on describing the various schools of Islamic thought:

> While classical jurist has a wide range of opinions on this matter – from deliberate failure to uphold a wa'd being morally reprehensible (Hanafi, Hanbali, Shafi'I majority opinions), to being legally actionable subject to the promise suffering loss due to reliance upon the promise (similar to promissory estopple, the opinion held by majority Malikis), whereas modern jurists have for the most part said it is cause for legal action if it is a wa'ad given with specific conditions (Firoozye, 2009, pg. 6).

What can be gathered from the literature relating to the permissibility of the use of the wa'ad is that the Maliki schools of Muslim thought accept its underlying principle as a financial instrument. Geographically, the literature also seems to indicate that only the Malaysian-styled Islamic finance is accepting of this new financial structure. Whatever the level of development, the objective of these tools would be to provide a strong basis for risk managers to manage risk within the Islamic economy.

This paper hopes to illustrate the processes involved with creating a new Shariah-compliant tool for risk management. Shariah-compliant innovation allows for some leeway in the interpretation of Shariah financial laws, which in turn provide some flexibility to financial innovators – e.g. the creation of a reverse *murabaha* structure (BMB, 2010).

Shariah compliance has been a recent trend and one can observe its benefits. Trying to, for the lack of a better term, amalgamate elements of mainstream finance with little diminishment of Shariah principles has provided a strong foundation for innovation and development of new products and services within the Islamic financial system (BMB, 2010). This allows Shariah finance to compete on a more level playing field with that of mainstream finance in aspects such as risk management and liquidity transfer. However, it should be noted that while the trend within Islamic finance is towards Shariah-compliant financial structures, many will argue that numerous Shariah-compliant services and products do not meet Shariah-based financial standards (Derigs and Marzban, 2008; DeLorenzo, 2000). Concerns regarding this recent trend for Shariah-compliant financial innovation come in the form of arguments against the creation of artifices (hiyal). The notion of artifices in Islamic finance relates predominately to two major aspects: the combination of two or more Shariah-based financial principles to create a product

that is no longer Shariah-compliant; and the impersonation of conventional financial payoffs via Shariah-compliant structures (Chapra, 2008; Hassan and Lewis, 2007). While the literature does raise significant concerns about Shariah-compliant financial innovation, there is also acceptance from these opponents that Islamic finance has to grow and develop.

In light with what was suggested by Askari *et al.* (2012), the focus of the risk management tool will be on risk sharing as opposed to risk transfer. Risk sharing is an important aspect of Islamic finance, although there are differing views on its importance and integration within financial instruments in Islamic finance. Supporters of risk sharing (Iqbal and Llewellyn, 2002; Dar and Presley, 2000a) feel that mark-up methods of financing are risk-concentrating. However, (Homoud, 1985) states that risk sharing is redundant within most financial contracts, as there are many financing needs with no outcome to share. Finally, there is also a third view which adopts a middle ground and suggests that the use of both risk sharing and mark-up would depend entirely on the financial situation (Dar and Presley, 2000b; Khan, 1992; Chapra, 1985).

It should be known that attempts would be made to keep the new tool in line with Shariah principles. However, the principles by which Shariah compliance is determined are based on the rulings of the Shariah Supervisory Board (SSB). There are several stipulations pertaining to the creation of new risk management tools. These concerns relate to the combination of several contracts to achieve a certain payoff as well as the uncertainty of estimating future outcomes. Where possible, the paper will justify the structure of the contract from a Shariah-compliant perspective.

Financial innovation in Shariah finance branches out into two subsets. One involves Shariah-based innovation, which involves the creation of an instrument that is completely Shariah – e.g. murabaha or musharakah. The other more along the lines of Western financial innovation is Shariah-compliant development (Khan, 2010). Shariah-compliant innovation allows for some leeway in Shariah interpretation of financial laws, which in turn give some flexibility to financial innovators – e.g. a reverse murabaha (BMB, 2010). However, some will argue that Shariah-compliant services and products are prohibited and are not truly Shariah (Derigs and Marzban, 2008; DeLorenzo, 2000).

As opposed to trying to develop a Shariah-based product, this research aims to develop a Shariah-compliant instrument. However, do note that the validation processes for Shariah compliance and approval can only be achieved through the SSB. Shariah compliance has been a recent trend and one can observe its benefits. Trying to, for the lack of a better term, amalgamate elements of mainstream finance with little diminishment of Shariah principles has provided a strong foundation for innovation and development of new products and services within the Islamic financial system. This allows Shariah finance to compete on a more level playing field with that of mainstream finance in aspects such as risk management and liquidity transfer.

The paper is organized as follows. The next section will illustrate two examples, one of a swap and the other of a simple wa'ad. Section 3 will outline the structure of a suggested tool, the result of the combination of a wa'ad and a murabaha. Finally, Section 4 concludes the paper.

2. Examples of Islamic financial innovation: Islamic profit rate swap and wa'ad

The ever-growing nature of Shariah finance has resulted in the creation of new Shariah-compliant products. There is a quickly developing chasm between Shariah-compliant and Shariah-based. Much of the Islamic "derivatives" that are available today are derived from their more traditional counterparts where mainstream derivatives are, to a certain extent, reverse-engineered to fit Shariah compliance regulations. Many of these Islamic "derivatives" involve the use of multiple murabaha (cost-plus financing) and wa'ad (promise) contracts. Murabaha contracts, as the translation suggests, is a permitted form of Islamic financing where the lender (e.g. bank) buys commodities from a broker and sells this on to the borrower at a mark-up, who is then able to sell this on to another broker. This is one of the most popular forms of Islamic financing and is the foundation of over 70 per cent of Islamic derivatives (Wilson, 2007).

2.1 Islamic profit rate swap

The most innovative use of a murabaha as an Islamic risk management instrument would be as a profit rate swap. These profit rate swaps operate in a similar fashion to interest rate swaps where two counterparties exchange fixed rates for floating rates. However, interest in this context is considered riba, and as such as opposed to swapping interest rates, parties swap profit streams instead. The structure of this instrument is described in Figure 1.

The structure illustrated in Figure 1 is a basic Islamic profit rate swap and like its traditional counterpart allows the transformation of fixed rate into floating rate and vice versa. This structure involves the use of two murabaha contracts – a straight murabaha and a parallel reverse murabaha. Steps 1 to 4 involve the straight murabaha where the floating rate payer purchases commodities from Broker 1 (Step 1) and sells these on, at a mark-up, to the fixed rate payer (Step 2), who then sells them on to Broker 2 (Step 3). The proceeds from the sale of the commodities are used to repay the initial murabaha at fixed intervals and with fixed amounts (Step 4). This completes the transformation from floating rate to fixed rate. Steps 5 to 8 illustrate the parallel reverse murabaha. The fixed rate payer purchases commodities from Broker 2 (Step 5) and sells these on to the

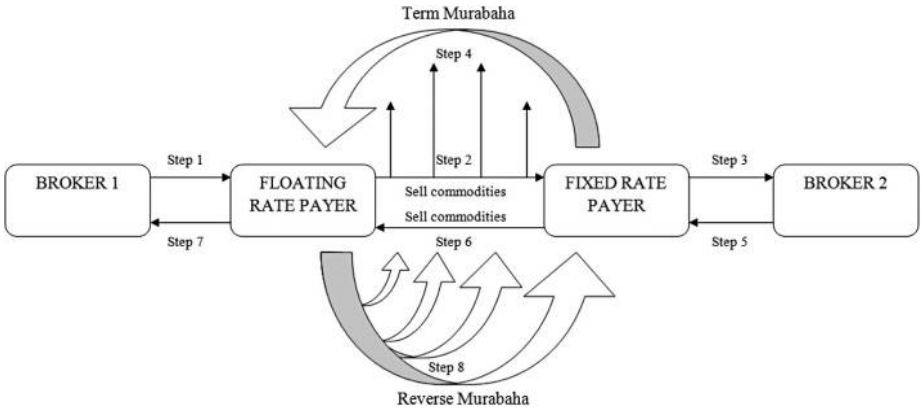

Figure 1.
Islamic profit rate swap (BMB, 2010)

floating rate payer at a mark-up (Step 6). These commodities are then sold periodically onto Broker 1 (Step 7), and the proceeds from these periodic sales are used to repay the murabaha (Step 8). While in the straight murabaha (Steps 1-4) the entire sum of commodities is sold immediately and the loan repaid in fixed payments over a period (e.g. every three months), the parallel reverse murabaha (Steps 5-8) requires that a portion of the commodities be sold periodically (e.g. three months) and repayments are made when sale occurs.

2.2 Wa'ad

A wa'ad is a contract that contains a unilateral promise to deliver a commodity at a price stipulated today at a future date. Within the realm of Islamic finance, a wa'ad is a morally binding and enforceable contract. However, the use of the wa'ad, at this point in time, is only limited to murabaha commodity contracts (BMB, 2010). The use of a wa'ad in Islamic finance is to recreate the payoff and characteristics of a mainstream call option. The structure is described in Figure 2.

Party B is afraid of a rise of the price for a particular commodity and enters into a wa'ad contract with Party A. This provides Party B with the right to purchase the commodity at a point in the future at a specified price and in return Party A is paid a non-refundable fee (premium). Should the price rise in the future, Party B would choose to exercise the wa'ad and hold Party A to its promise and purchase the commodity at the stipulated price. On the other hand, should the price fall, Party B can choose not to exercise the wa'ad and purchase from the market. In either case, Party A is compensated for providing the service.

This is fundamentally the Islamic equivalent of a call option, and elements such as spot and strike prices and premiums behave in a similar manner to their mainstream counterparts. However, the only difference would be the bespoke nature of many of these wa'ad contracts as compared to call option contracts. Moreover, like its mainstream counterpart, the risk management emphasis here is on risk transfer as opposed to risk sharing.

3. The structure of the product

What would best describe the processes involved with this paper is to create a risk management tool that adheres, to the best of our knowledge, to Shariah-compliant standards and would adequately perform in the practical world. The main specifications of the instrument would involve not only trying to achieve a sufficient hedge but also trying to incorporate an element of risk sharing as opposed to risk transfer. With the priority placed on risk sharing as opposed to risk transfer, the basis of the model would loosely follow the structure of a musharakah, where two parties come together for a financial transaction. Note that although the notion of risk sharing is most advocated via a musharakah structure, the hybrid product does not incorporate a musharakah as such.

The question then is could we apply the principle of risk sharing within the spectrum of a "partnership" option where the call option writer shares the risk with the call option

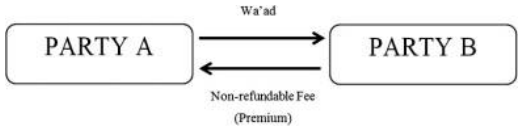

Figure 2.
Wa'ad (BMB, 2010)

buyer? So how do we achieve this risk-sharing mode of risk management? One possible model is illustrated in Figure 3.

The designations of the parties in the structure above are as follows:

- Party 1: Bank – organizer of the structure.
- Party 2: Customer – requires protection from price increases and seeks coverage from bank.
- Party 3: Wa'ad seller – facilitates the option element in the structure.

Summary of symbols:

- α^0: Party 1's share of amount of commodity to be purchased.
- α^1: Party 2's share of amount of commodity to be purchased.
- β^1: Premium for wa'ad (in some instances it could also be a down payment).
- S_0: spot price at time T_0.
- S_1: spot price at time T_1.
- X^1: cost plus mark-up price of murabaha (let set it equal to $S_0 + \beta^1$).
- Q^1: exercise price of wa'ad (clearly above S_0, but could include/not include β^1 if this is a down payment).

Party 2 is afraid of a rise in prices and wishes to protect itself. Within this hybrid contract, Party 2 contacts Party 1 to organize a structure for protection against a rise in prices. Under the stipulations of this contract, both Party 1 and Party 2 enter into an agreement to share the costs and benefits of a wa'ad that is purchased from Party 3. The cost of the wa'ad (β^1) is split between Party 1 and Party 2 based on a predetermined ratio (α^0: α^1) with exercise price (Q^1). This ratio will also determine the spilt for the amount of tangible goods, should the wa'ad be exercised.

At the same time, a murabaha is set up between Party 1 and Party 2 whereby it is agreed that at the expiry of the wa'ad option, Party 1 will sell its proportion of the commodity at cost plus some mark-up, which we set, without loss of generalization as equal to $X^1 = S_0 + \beta^1$, the same as the premium of the wa'ad. Apart from simplifying the algebra, both the mark-up and the premium will be known (and set) at the same time T_0 and will enable the direct comparison of the hybrid product, with a straight murabaha and a straight wa'ad. This will be regardless of whether the wa'ad is exercised. Moreover, to adhere to the principles of Islamic finance, the bank will purchase its share (α^0) of the commodity at time T_0 at price S_0 and retain ownership of it until T_1.

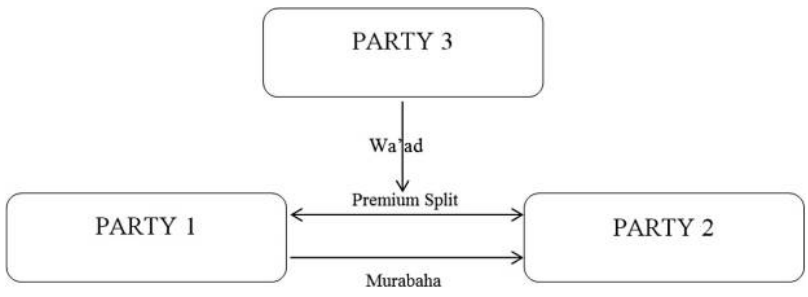

Figure 3.
Hybrid structure combining wa'ad and murabaha contracts

Should the wa'ad not be exercised, Party 1 will then pass its share of the commodity onto Party 2 for the agreed price inclusive of a mark-up ($S_0 + \beta^1$), whereas if the wa'ad is exercised, then Party 1 (the bank) will purchase its share (α^0) of the commodity from Party 3, but sell it at S_1 onto the market, while passing the commodity already in its possession onto Party 2.

3.1 Payoffs for each of the parties

The following paragraphs will illustrate the model in two different scenarios. It should be noted that this structure is for a call option and as such Party 2 is afraid of a rise in prices[1].

(1) Scenario 1: For $S_1 > Q^1$ wa'ad is exercised.

- Payoffs at time T_0:
  - Party 1 pays premium to Party 3 = $\alpha^0 \beta^1$.
  - Party 2 pays premium to Party 3 = $\alpha^1 \beta^1$.
  - Party 1 (the bank) purchases α^0 of the commodity at S_0.
- Payoffs at time T_1:
  - wa'ad is exercised.
  - Party 1 takes delivery of commodity and pays Party 3 = $\alpha^0 Q^1$.
  - Party 1 sells its portion of the commodity onto Party 2 at cost plus some mark-up = $\alpha^0 X^1$ or $\alpha^0 (S_0 + \beta^1)$.
  - Party 1 sells its portion α^0 of the commodity at the spot price S_1.
  - Party 2 takes delivery of commodity and pays Party 3 = $\alpha^1 Q^1$

(2) Scenario 2: For $S_1 < Q^1$ wa'ad is not exercised.

- Payoffs at time T_0:
  - Party 1 pays premium to Party 3 = $\alpha^0 \beta^1$.
  - Party 1 (the bank) purchases α^0 of the commodity at S_0.
  - Party 2 pays premium to Party 3 = $\alpha^1 \beta^1$.
- Payoffs at time T_1:
  - wa'ad is not exercised.
  - Party 1 sells its proportion of commodity to Party 2 at cost plus some mark-up = $\alpha^0 X^1$ or $\alpha^0 (S_0 + \beta^1)$.
  - Party 2 purchases commodity from spot market = $\alpha^1 S_1$.
  - Party 3 sells commodity on the spot market at S_1.

The tables below provide a better illustration of the payoffs for each party in each scenario[2]. Table I and Figure 4 indicate the payoffs for the bank (Party 1). Figure 4 is the pictorial representation for the payoffs for Party 1 (the bank) to provide the reader with a better illustration of how the hybrid structure works.

It should be noted as well that while the literature (see Razali, 2008) is unclear as to whether continued ownership of the underlying commodity is required in the wa'ad structure, this study will assume that this ownership is mandatory as per classical Islamic financial law so as to avoid *gharar* (uncertainty).

Figure 4 indicates the payoff for the bank (Party 1). What can be seen is that if $S_1 < Q^1$, the wa'ad is not exercised and Party 1 will not buy the commodity from Party 3. However, Party 1 will have paid the premium ($\alpha^0\beta^1$) to Party 3 and will have purchased its own share of the commodity, with a view to selling it onto Party 2, which the bank will do for the mark-up, set exactly at the price ($S_0 + \beta^1$). In this case, the net outcome is zero.

If $S_1 > Q^1$, the wa'ad is exercised and Party 1 will buy its own share of the commodity from Partner 3. This will then be sold to Partner 2. However, the bank still has ownership of α^0 of the commodity, paid S_0 at T_0. The bank can now sell it for a profit equal to $\alpha^0(S_1 - Q^1)$, which is the ratio split for the bank multiplied by the difference between the spot price at expiry and the exercise price of the wa'ad.

Figure 5 and Table II highlight the payoffs of the customer (Party 2). It is worth remembering that Partner 2 is afraid that the price of the commodity could increase. By engaging in this hybrid product, the net cost of the overall contract for the customer when $S_1 > Q^1$ is constrained at $-\alpha^1Q^1 - (\alpha^0 + \alpha^1)\beta^1 - \alpha^0S_0$, while when $S_1 < Q^1$, the cost is $-\alpha^1S_1 - (\alpha^0 + \alpha^1)\beta^1 - \alpha^0S_0$.

Table III and Figure 6 present the payoffs for Party 3 (the seller of the wa'ad). In this case, Party 3 will at time T_0 receive the premium β^1, but also will need to purchase the commodity at S_0. Under Scenario 1 (the wa'ad is exercised, i.e. $S_1 > Q^1$), to honour the wa'ad, Party 3 will sell the commodity at Q^1. The profit for Party 3, who already owns

Party 1 (partner bank) Scenario 1	Party 1 (partner bank) Scenario 2
For $S_1 > Q^1$	For $S_1 < Q^1$
Wa'ad is exercised	Wa'ad is NOT exercised
T_0: pay premium to Party 3	T_0: pay premium to Party 3
$-\alpha^0\beta^1$	$-\alpha^0\beta^1$
Purchase α^0 of commodity	Purchase α^0 of commodity
$-\alpha^0S_0$	$-\alpha^0S_0$
T_1: $-\alpha^0Q^1 + \alpha^0(S_0 + \beta^1) + \alpha^0S_1$	T_1: $+\alpha^0(S_0 + \beta^1)$
NET: $+\alpha^0(S_1 - Q^1)$	NET: 0

Table I.
Payoffs for Party 1 (partner bank) under Scenario 1 and Scenario 2

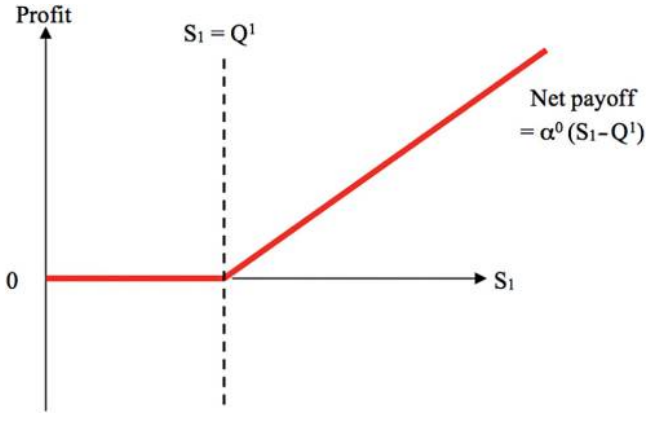

Figure 4.
Option payoff for the bank (Party 1)

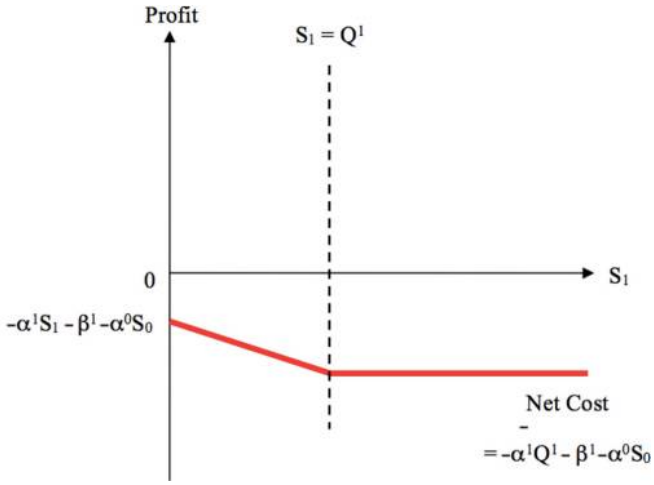

Figure 5.
Net cost of the option for the customer (Party 2)

Party 2 (customer) Scenario 1	Party 2 (customer) Scenario 2
For $S_1 > Q^1$	For $S_1 < Q^1$
Wa'ad is exercised	Wa'ad NOT exercised
T_0: Pay premium to Party 3	T_0: Pay premium to Party 3
$-\alpha^1\beta^1$	$-\alpha^1\beta^1$
T_1: $-\alpha^1 Q^1 - \alpha^0(S_0 + \beta^1)$	T_1: $-\alpha^1 S_1 - \alpha^0(S_0 + \beta^1)$
NET: $-\alpha^1 Q^1 - (\alpha^0 + \alpha^1)\,\beta^1 - \alpha^0 S_0$	NET: $-\alpha^1 S_1 - (\alpha^0 + \alpha^1)\,\beta^1 - \alpha^0 S_0$
or $-(\alpha^1 Q^1 + \beta^1 + \alpha^0 S_0)$	or $-(\alpha^1 S_1 + \beta^1 + \alpha^0 S_0)$

Table II.
Payoffs for Party 2 (customer) under Scenario 1 and Scenario 2

the commodity, which was purchased at T_0 at the prevailing price S_0, is equal to $\beta^1 + [Q^1 - S_0]$. This profit is clearly larger than zero and is constant when $S_1 > Q^1$. Please note that to facilitate the understanding of the diagram, exceptionally, Q^1 (the strike price) was set equal to S_0.

However, if $S_1 < Q^1$ and the wa'ad is not exercised, Party 3 will gain the premium β^1 paid upfront at T_0, but will also need to buy the commodity at S_0 and then re-sell it at S_1. The benefits of this structure for Party 3 will depend greatly on the price at which they are able to purchase the commodity and then re-sell it onto the market at S_1. The losses for Party 3 in this case can be explained by the formula $\beta^1 + S_1 - S_0$. However, even in the case that the price of the commodity should fall to zero ($S_1 = 0$), its losses would be limited to $\beta^1 - S_0$.

It is possible to draw some conclusions from the above analysis. Party 1, the bank, benefits if the price of the commodity increases. This nicely complements the fear of Party 2, who is afraid of a price raise. Therefore, they can mutually benefit from the partnership. In the case of Party 3 (the wa'ad seller), the worst scenario is a fall in the price of the commodity, but the loss would be known in advance with a clear limit.

Further interesting comments may be drawn by comparing the case when the combined strategy (wa'ad plus murabaha with sharing) is applied with a straight wa'ad and no sharing.

It is possible to see from Table IV that in the case that the wa'ad is exercised, Party 2 (customer) is better off in the combined product because the (absolute value of the) net outcome (expenditure) of the combined product when the wa'ad is exercised is:

$|-\alpha^1 Q^1 - (\alpha^0 + \alpha^1)\beta^1 - \alpha^0 S_0|$ which is less than $|-(\alpha^0 + \alpha^1)\beta^1 - (\alpha^0 + \alpha^1) Q^1|$, as S_0 is less than Q^1.

However, Party 2 (customer) is NOT better off with the combined product, when the wa'ad is NOT exercised, because the (absolute value of the) net outcome is:

$|-\alpha^1 S_1 - (\alpha^0 + \alpha^1)\beta^1 - \alpha^0 S_0|$ that is less than $|-(\alpha^0 + \alpha^1)\beta^1 - (\alpha^0 + \alpha^1) S_1|$, as S_1 is less than S_0.

Although we ignore the inter-temporal analysis, it should be noted that Party 2 is paying less at T_0 in terms of the premium (i.e. $-\alpha^1\beta^1$ instead of $-(\alpha^0 + \alpha^1)\beta^1$ of the straight murabaha) (Table V).

The comparison with a straight murabaha shows that the customer is worse off when the price increases and the wa'ad is exercised because Q^1 is larger than S_0:

Party 3 (wa'ad seller) Scenario 1	Party 3 (wa'ad seller) Scenario 2
For $S_1 > Q^1$	For $S_1 < Q^1$
Wa'ad is exercised	Wa'ad NOT exercised
T_0: receive premium from Party 1 and Party 2	T_0: receive premium from Party 1 and Party 2
$+\alpha^0\beta^1 + \alpha^1\beta^1$	$+\alpha^0\beta^1 + \alpha^1\beta^1$
Purchase $(\alpha^0 + \alpha^1)$ of commodity	Purchase $(\alpha^0 + \alpha^1)$ of commodity
$-(\alpha^0 + \alpha^1) S_0$	$-(\alpha^0 + \alpha^1) S_0$
T_1: honour promise to sell commodity to Party 1 and Party 2 at agreed price Q^1	T_1: sell commodity at spot price S_1
$+(\alpha^0 + \alpha^1) Q^1$	$+(\alpha^0 + \alpha^1) S_1$
NET: $+(\alpha^0 + \alpha^1)\beta^1 + (\alpha^0 + \alpha^1) Q^1 - (\alpha^0 + \alpha^1) S_0$ or $+\beta^1 + Q^1 - S_0$	NET: $+(\alpha^0 + \alpha^1)(S_1 - S_0) + (\alpha^0 + \alpha^1)\beta^1$ or $(S_1 - S_0) + \beta^1$

Table III.
Scenario 1 and Scenario 2 for Party 3 (wa'ad seller)

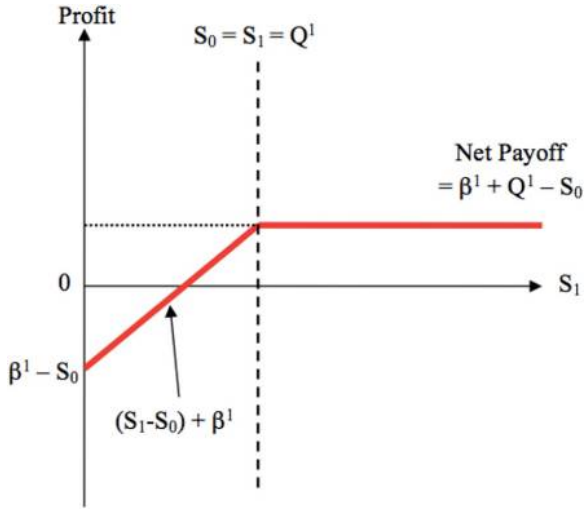

Figure 6.
Payoff of the option for the wa'ad seller (Party 3)[3]

Straight wa'ad (wa'ad exercised)	Straight wa'ad (wa'ad NOT exercised)	Combined product (wa'ad exercised)	Combined product (wa'ad NOT exercised)
T_0: pay premium to Party 3 $-(\alpha^0 + \alpha^1)\,\beta^1$ T_1: EXERCISED $-(\alpha^0 + \alpha^1)\,Q^1$ NET: $-(\alpha^0 + \alpha^1)\,\beta^1$ $-(\alpha^0 + \alpha^1)\,Q^1$ or $-(\beta^1 + Q^1)$	T_0: pay premium to Party 3 $-(\alpha^0 + \alpha^1)\,\beta^1$ T_1: NOT EXERCISED $-(\alpha^0 + \alpha^1)\,S_1$ NET: $-(\alpha^0 + \alpha^1)\,\beta^1$ $-(\alpha^0 + \alpha^1)\,S_1$ or $-(\beta^1 + S_1)$	T_0: pay premium to Party 3 $-\alpha^1\beta^1$ T_1: $-\alpha^1Q^1$ $-\alpha^0(S_0 + \beta^1)$ NET: $-\alpha^1Q^1$ $-(\alpha^0 + \alpha^1)\,\beta^1$ $-\alpha^0S_0$ or $-(\alpha^1Q^1$ $+\beta^1 + \alpha^0S_0)$	T_0: pay premium to Party 3 $-\alpha^1\beta^1$ T_1: $-\alpha^1S_1$ $-\alpha^0(S_0 + \beta^1)$ NET: $-\alpha^1S_1$ $-(\alpha^0 + \alpha^1)\,\beta^1$ $-\alpha^0S_0$ or $-(\alpha^1S_1$ $+\beta^1 + \alpha^0S_0)$

Table IV. Comparison with straight wa'ad (no sharing no murabaha) from the point of view of Party 2 (customer)

Straight murabaha	Combined product (wa'ad exercised)	Combined product (wa'ad NOT exercised)
T_0: agree sale for mark-up $(S_0 + \beta^1)$ T1: $-(\alpha^0 + \alpha^1)\,(S_0+\beta^1)$ NET: $-(\alpha^0 + \alpha^1)\,(S_0+\beta^1)$ or $-(S_0 + \beta^1)$	T_0: pay premium to Party 3 $-\alpha^1\beta^1$ T_1: $-\alpha^1Q^1 - \alpha^0(S_0 + \beta^1)$ NET: $-\alpha^1Q^1 - (\alpha^0 + \alpha^1)\,\beta^1$ $-\alpha^0S_0$ or $-\alpha^1Q^1 - \beta^1 - \alpha^0S_0$	T_0: pay premium to Party 3 $-\alpha^1\beta^1$ T_1: $-\alpha^1S_1 - \alpha^0(S_0 + \beta^1)$ NET: $-\alpha^1S_1 - (\alpha^0 + \alpha^1)\,\beta^1$ $-\alpha^0S_0$ or $-\alpha^1S_1 - \beta^1 - \alpha^0S_0$

Table V. Comparison with no sharing (straight murabaha) from the point of view of Party 2 (customer)

$|-\alpha^1Q^1 - (\alpha^0 + \alpha^1)\,\beta^1 - \alpha^0S_0| > |-(\alpha^0 + \alpha^1)\,(S_0 + \beta^1)|$, or after some simplification, $|-\alpha^1Q^1| > |-a^1S_0|$.

The comparison with a straight murabaha shows that the customer is better off when the price decreases and the wa'ad is NOT exercised:

$|-(\alpha^0 + \alpha^1)\,(S_0 + \beta^1)| > |-\alpha^1S_1 - (\alpha^0 + \alpha^1)\,\beta^1 - \alpha^0S_0|$, or after some simplification, $|-\alpha^1S_0| > |-\alpha^1S_1|$.

In other words, when the price increases, Party 2 is worse off in comparison to a straight murabaha (with no sharing). In partial mitigation, it must be said that the (relative) loss is constrained at Q^1 and a smaller share in the project (α^1) would further reduce these losses. However, when the price falls, Part 2 will benefit, depending on whether $S_1 < S_0$.

Finally, as shown in Table VI, the comparison with a straight murabaha, from the point of view of the bank, reveals a complex pattern. The bank secures a guaranteed mark-up $(\alpha^0 + \alpha^1)\,\beta^1$ in the case of the murabaha. The outcome of the combined product, as already explained, depends on the size of the movement of the price of the commodity at time T_1 (S_1) and the agreed exercise price for the wa'ad. In the case where the wa'ad is exercised (i.e. $S_1 > Q1$), the comparison depends on the size of β_1, S_1 and Q^1 to establish whether:

$+(\alpha^0 + \alpha^1)\,\beta_1 > +\alpha^0(S_1 - Q^1)$ or $+(\alpha^0 + \alpha^1)\,\beta_1 < +\alpha^0(S_1 - Q^1)$

The bank, however, has a zero outcome from the hybrid product when $S_1 < Q1$ and the wa'ad is NOT exercised:

$(\alpha^0 + \alpha^1)\,\beta^1 > 0$

In the case the wa'ad is not exercised, therefore, the bank is clearly worse off in comparison to a straight murabaha.

To sum up and in partial mitigation to the above conclusions, which seem to indicate that the bank does not have much incentive in setting up the hybrid structure, the bank can be better off, the larger the difference between S_1 and Q^1, as the value of β^1 (the premium for the wa'ad) is known in advance and can be recouped as the mark-up. It should also be noted that the hybrid product involves ownership [at of only α^0 of the commodity and not the entire $(\alpha^0 + \alpha^1)$] envisaged by the straight murabaha.

3.2 Few considerations

Firstly, while the researchers feel that the use of risk sharing is more in line with Shariah principles, there are grounds on which to argue that the purchase of commodities does not amount to a plausible investment. The use of a risk-sharing agreement and wa'ad in this manner may make it non-Shariah-complaint if it is deemed that there is no active management of the investment sum to justify the partnership in the first place.

Secondly, admittedly it is a complicated method to structure an option. The want for risk sharing meant that one additional party had to be included into the contract in what would otherwise be achieved with a straightforward wa'ad.

It has to be illustrated that the risk-sharing element is between the bank (who sets up the entire contract) and the customer. There is still semblance of risk transfer between the bank and customer (as purchaser of the hybrid product) and the seller of the hybrid product. This is based on the assumption that Party 3 has the opposite expectations to both Party 1 and 2.

4. Conclusions

This paper has reviewed some of the issues regarding the use and development of risk management tools within the context of Islamic finance. This paper has also attempted to suggest a possible development by applying the principle of risk-sharing agreement to a combination of a wa'ad contract to a murabaha contract.

The combination of a wa'ad and a murabaha contract to create a hybrid risk-sharing approach to financial risk management has yielded mixed results when compared to straightforward wa'ad and murabaha contracts.

Comparing the hybrid product to either a straight murabaha or a straight wa'ad from the point of view of the customer produces a mixed picture. When compared to the wa'ad alone, the hybrid contract was more beneficial to the customer when it was in-the-money but less when out-of-the-money. Vice versa, when the hybrid was compared to a straight murabaha, it was less beneficial on the upside but was cheaper when the contract was out-of-the-money.

Table VI.
Comparison with no sharing (straight murabaha) from the point of view of Party 1 (bank)

Straight murabaha	Combined product (wa'ad exercised)	Combined product (wa'ad NOT exercised)
T_0: agree sale for mark-up $(S_0 + \beta^1)$	T_0: pay premium to Party 3 $-\alpha^0\beta^1$	T_0: pay premium to Party 3 $-\alpha^0\beta^1$
Purchase commodity at $-(\alpha^0 + \alpha^1)\, S_0$	Purchase α^0 of commodity $-\alpha^0 S_0$	Purchase α^0 of commodity $-\alpha^0 S_0$
T_1: $+(\alpha^0 + \alpha^1)\,(S_0 + \beta^1)$	T_1: $-\alpha^0 Q^1 + \alpha^0(S_0 + \beta^1) + \alpha^0 S_1$	T_1: $+\alpha^0(S_0 + \beta^1)$
NET: $+(\alpha^0 + \alpha^1)\,\beta^1$ or β^1	NET: $+\alpha^0(S_1 - Q^1)$	NET: 0

Similarly, a comparison of the hybrid product to either a straight murabaha or a straight wa'ad from the point of view of the bank shows that the bank is slightly worse off, although the picture is a little bit mixed, depending on the behaviour of the price of the commodity at T_1.

In conclusion, this study set out to explore the scope of incorporating risk sharing within risk management option-like tools under a Shariah financial framework, and while the results do not provide a definitive argument of the advantages, they do illustrate certain benefits of risk-sharing methodologies within financial instruments such as that of premiums and down payments.

Notes

1. Note that the ratio split, $\alpha^0 + \alpha^1$, will always equal to 1 or 100 per cent.
2. Please note that a negative sign denote expenditure, while a positive sign denotes revenue. Costs of storage involved in the actual physical ownership of the commodity have not been incorporated.
3. The assumption based on fundamental Islamic financial law that ownership is required in the context of this risk management structure proves valuable to the hybrid product seller, as it puts a floor on the potential loss for Party 3.

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Appendix

Islamic finance terms	Interpretation
Riba	Usury or excessive interest Riba in this context would also include selling money for money
Gharar	Excessive uncertainty
Maysir	Gambling Maysir is thought to be a product of gharar
Halal	Permitted by the Quran
Murabaha	Cost-plus financing contract
Musharakah	Partnership contract
Wa'ad	Legally binding promise

Table AI.
Glossary of Islamic financial terms

About the authors

Seng Kiong Kok is a Lecturer in International Finance at the Wolverhampton University Business School. His research interests are focused on risk management, financial product design and exploring the development of Islamic finance and its acceptance in today's economic spectrum.

Gianluigi Giorgioni is a Lecturer in Economics and Finance at the University of Liverpool. His research interests are focused on Islamic finance, the relationship between finance and economic growth, the empirical assessment of the relative benefits of different sources of finance with particular emphasis on FDI in the context of emerging markets and the determinants and consequences of disclosure. Gianluigi Giorgioni is the corresponding author and can be contacted at: G.Giorgioni@liverpool.ac.uk

Jason Laws is a Senior Lecturer in Finance at the University of Liverpool Management School. His research interests are primarily in the area of risk management and how forecasting methods allied with suitable derivative securities can generate an optimal hedging strategy.