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ABSTRACT

Despite their importance for financial sector development, derivatives are few and far between in countries where the compatibility of capital market transactions with Islamic law requires the development of Sharīʿah-compliant structures. Islamic finance is governed by the Sharīʿah, which bans speculation, but stipulates that income must be derived as profits from shared business risk rather than interest or guaranteed return. This paper explains the fundamental legal principles of Islamic finance, which includes the presentation of a valuation model that helps illustrate the Sharīʿah-compliant synthetication of conventional finance through an implicit derivative arrangement. Based on the current use of accepted risk transfer mechanisms in Islamic structured finance, the paper explore the validity of derivatives from an Islamic legal point of view and summarizes the key objections of Sharīʿah scholars that challenge the permissibility of derivatives under Islamic law. In conclusion, the paper delivers suggestions for Sharīʿah compliance of derivatives.

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1. INTRODUCTION

Financial globalization facilitates greater diversification of investment and enables risk to be transferred across national financial systems through derivatives. The resulting improvement in allocation of risks has made overall capital markets more efficient, while the availability of derivatives has increased liquidity in the underlying cash markets. Amid a compressed spread environment, lower risk premia have also encouraged investors to seek higher yields from emerging market assets as alternative investment. With increasingly market-determined emerging market interest rates and currencies, extension of emerging market yield curves, rapidly growing volume of international trade and capital flows, and increasing stock market activity, the local and foreign interest in emerging derivative markets is growing rapidly.

The development of derivative markets in emerging markets plays a special role in this context as more institutional money is dedicated to emerging markets, which requires the availability of financial instruments to manage market, credit and interest rate risks in largely underdeveloped local capital markets. Derivatives in general are financial contracts whose inherent value derives from, and exists by reference to, a pre-determined payoff structure of securities, interest rates, commodities, credit risk, foreign exchange or any other tradable assets, indices thereof and/or baskets of any combination of the above with varied maturities. Derivatives assume economic gains from both risk shifting and efficient price discovery by providing hedging and low-cost arbitrage opportunities.

While documentation standards and market practices that govern conventional derivative transactions in mature markets have reached a point of uniform application, derivative markets are still poorly developed in many emerging market countries due to the absence of enabling legal provisions and accounting standards specific to the trading and enforcement of derivative claims have inhibited a maturing of derivative markets.

Despite their importance for financial sector development, derivatives are few and far between in countries where the compatibility of capital market transactions with Islamic law requires the development of Sharīʿah-compliant structures. Islamic finance is governed by the Sharīʿah, which bans interest, short selling and speculation, and stipulates that income must be derived as profits from shared business risk rather than guaranteed return. Notwithstanding these religious constraints and legal uncertainty surrounding the enforceability of investor interest under Islamic jurisprudence, Islamic finance can synthesize close equivalents to equity, mortgages, and derivatives known in conventional finance. To this end, it relies on structural arrangements of asset transfer between borrowers and lenders to emulate traditional interest-bearing financial contracts.

This paper explains the fundamental legal principles of Islamic finance, which includes the presentation of a valuation model that helps illustrate the Sharīʿah-compliant synthetication of conventional finance through an implicit derivative arrangement. Based on the current use of accepted risk transfer mechanisms in Islamic structured finance, the paper explores the validity of derivatives from an Islamic legal point of view and evaluates key objections of Sharīʿah scholars challenging the permissibility of derivatives under Islamic law. In conclusion, the paper delivers suggestions for Sharīʿah compliance of derivatives.

2. THE TYPES OF ISLAMIC FINANCE

Islamic finance substitutes the costly temporary use of assets for a permanent transfer of funds as a source of borrower indebtedness. While interest payments in conventional finance represent the contractible cost for funds tied to the amount of principal over a pre-specified lending period, the central tenet of the Islamic financial system is the prohibition of *riba*, which applies to any unlawful capital gain derived from the quantitative inequality of the counter values of exchange or sales contracts.[1,2] *Riba* is generally classified into unlawful advantage by way of excess *(riba al-fadl)* and deferment *(riba al-nasia)* respectively.[3] Islamic law derives from (i) the Sharīʿahah (or Sharīʿah), which comprises the Qur'an and the sayings and actions of the prophet *Mohammed* recorded in a collection of books know as the *sahih hadith*, and (ii) the *fiqh*, which represents Islamic jurisprudence based on a

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[1] The general consensus among Islamic scholars is that *riba* covers not only usury but also the charging of interest and any positive, fixed, predetermined rate of return that are guaranteed regardless of the performance of an investment (Iqbal and Tsubota, 2006; Iqbal and Mirakhor, 2006). Besides interest earnings (or usury *(riba)*) and money lending, Islamic law also prohibits (i) *haram* (sinful activity), such as direct or indirect association with lines of business involving alcohol, pork products, firearms, tobacco, and adult entertainment, (ii) speculation, betting, and gambling *(maisir)*, including the speculative trade or exchange of money for debt *without* an underlying asset transfer, (iii) the trading of the same object between buyer and seller *(bayʿ al-inah)*, as well as (iv) preventable uncertainty *(gharar)*, such as all financial derivative instruments, forward contracts, and futures agreements for speculative (rather than hedging) purposes.

[2] While the elimination of interest is fundamental to Islamic finance, sharīʿah-compliant investment behavior also aims to eliminate exploitation pursuant to Islamic law. *Riba* applies to any transaction purporting to effect the profitable exchange of two or more species *(anwa)* that belong to the same genus *(jins)* and are governed by the same efficient cause *(illah)*.

[3] The prohibition of *riba* is upheld if the rate of exchange between two objects is unity and no gain is permissible to either party and if deferred settlement is disallowed, which ensures that the transaction is settled on the spot by both parties.

body of laws deducted from the Sharı͟ah by Islamic scholars. The Sharı͟ah is frequently characterized as Islamic religious law, which is binding upon Muslims as a matter of religious mandate and also may be incorporated into the secular law of a given jurisdiction (Jobst, 2007b and 2007d).

Since only interest-free forms of finance are considered permissible in Islamic finance, financial relationships between financiers and borrowers are not governed by capital-based investment gains but shared business risk (and returns) in lawful activities *(halal)*. Any financial transaction under Islamic law implies *direct participation in asset performance*, which constitutes entrepreneurial investment that assigns to financiers clearly identifiable rights and obligations for which they are entitled to receive commensurate return in the form of state-contingent payments according to an agreed schedule and amount relative to asset performance.[4] The Sharı͟ah does not object to payment for the use of an asset as long as both lender and borrower share the investment risk together and profits are not guaranteed *ex ante* but accrue only if the investment itself yields income.

In light of moral impediments to "passive" investment and secured interest as form of compensation, Sharı͟ah-compliant lending requires the replication of interest-bearing conventional finance via more complex structural arrangements of contingent claims subject to the intent to create of an equitable system of distributive justice and promote permitted activities *(halal)* and public goods *(maslahah)*. The permissibility of risky capital investment without explicit interest earning has spawned three basic forms of Islamic financing for both investment and trade: (i) synthetic loans *(debt-based)* through a sale-repurchase agreement or back-to-back sale of borrower or third party-held assets, (ii) lease contracts *(asset-based)* through a sale-leaseback agreement (operating lease) or the lease of third-party acquired assets with purchase obligation components (financing lease), and (iii) profit-sharing contracts *(equity-based)* of future assets. As opposed to equity-based contracts, both debt- and asset-based contracts are initiated by a temporary transfer of existing assets from the borrower to the lender or the acquisition of third-party assets by the lender on behalf of the borrower.[5]

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[4] The underlying asset transfer of Islamic lending arrangements provides collateralization until the lender relinquishes ownership at the maturity date. In equity-based Islamic investments, lenders do not have any recourse unless pre-mature termination enables the lender to recover some investment funds from the salvage value of project assets.

[5] In a debt-based *synthetic loan*, the borrower repurchases the assets from the lender at a higher price than the original sales price, whereas borrowers under a *lease-back agreement* repurchase the assets at the same price at the end of the transaction and pay quasi-interest in the form of leasing fees for the duration of the loan.

"Islamic loans" create borrower indebtedness from the purchase and resale of an (existing or future) asset in lieu of interest payments. The most prominent form of such a "debt-based" structural arrangement is the *murabahah (or murabahah)* ("cost-plus sale") contract. Interest payments are implicit in an installment sale with instantaneous (or deferred) title transfer for the promised payment of an agreed sales price in the future.[6] The purchase price of the underlying asset effectively limits the degree of debt creation. A *murabahah* contract either involves (i) the sale-repurchase agreement of a borrower-held asset ("negative short sale") or (ii) the lender's purchase of a tangible asset from a third party on behalf of the borrower ("back-to-back sale"), which the borrower sells on to a third party to obtain funding.[7] The resale price is based on original cost plus a pre-specified profit markup imposed by the lender so that the borrower's future repurchase of the underlying asset or the sale of the asset to a third party to raise funds at the spot price involves a loss commensurate to the lender's profit ("loss-generating contract").

Different installment rates as well as delayed repayment and asset-delivery schedules for "back-to-back sales" and "negative short sales" respectively create variations to the standard *murabahah* contract. The most prominent examples are *salam* (deferred delivery sale), *bay[bithaman ajil* (BBA) (deferred payment sale), *istisna[* (or *istisna, istisna'a*) (purchase order), *qard al-hasan* (benevolent loan), and *musawama* (negotiable sale). As opposed to the concurrent purchase and delivery of an asset in *murabahah*, asset purchases under a *salam*[8] or a *bay[bithaman ajil*[9] contract allow deferred delivery or payment of *existing* assets. *Salam* closely synthesizes a conventional futures contract and is sometimes also considered an independent asset class outside the asset spectrum of *murabahah* (Batchvarov and

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[6] The so-called commodity *murabahah* is a frequently used from of wholesale debt-based Islamic finance between a bank and its client to replicate short-term money market deposits and medium-term syndicated loans. Such a contract involves the sale on a deferred payment basis of a commodity, usually metals, at the market price plus an agreed profit margin to the borrower, who raises the required funds by immediately selling the asset to a broker or a financial institution.

[7] The distinction of asset origin is critical in the assessment of the degree of collateralization of debt-based Islamic finance. If the purpose of the contract involves the repurchase of the contractual reference asset (if the asset was originally held by the borrower), the lender has full recourse; however, if the asset was originally held by a third party and the borrower plans to acquire any asset (with the reference asset representing the loan value), collateralization depends on the rate of deferment of ownership interest transferred by the lender.

[8] *Salam* contracts are mostly used in agricultural finance.

[9] A *bay[bithaman ajil* (BBA) contract is primarily used for long-term financing and does not require the lender to disclose the profit margin.

Gakwaya, 2006). An *istiṣnaʿ* contract provides pre-delivery (project) finance for *future* assets, such as long-term projects, which the borrower promises to complete over the term of the lending agreement according to contractual specifications. A *qarḍ al-ḥasan* signifies an interest-free loan contract that is usually collateralized. Finally, a *muswama* contract represents a negotiable sale, where the profit margin is hidden from the buyer.[10]

Analogous to conventional operating and finance leases, *al-ijarah* leasing notes[11] ("asset-based") provide credit in return for rental payments[12] over the term of the temporary use of an (existing) asset, conditional on the future re-purchase of the assets by the borrower.[13] The lease cash flow is the primary component of debt service. The lessor (i.e., financier) acquires the asset either from the borrower[14] (*operating lease* or "sale-leaseback"/"lease-buyback") or a third party at the request of the borrower (*financing lease* or "lease-purchase") and leases it to the borrower (or a third party) for an agreed sum of rental payable in installments according to an agreed schedule. The legal title of the asset remains with the financier for the duration of the transaction. The financier bears all the costs associated with the ownership of the asset, whereas the costs from the use of the asset have to be defrayed by the lessee.[15, 16] If the *ijarah* transaction is a financing

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[10] This form of *murabahah* is only permitted for merchant banks, as in the case of *Kuwait Finance House*'s in-house car dealership.

[11] An *ijarah* lease fulfills the functions of either a finance or operating lease. It is increasingly used in aircraft finance by lessees in Islamic countries and in operating lease-back transactions, which combine conventional lending with Islamic investment. Note that Islamic scholars make no distinction between operating and financial leases as to the classification of profits from the use of assets against the prohibition of interest.

[12] However, rental payments and their adjustment to changing market conditions (for floating-rate financed assets) cannot be expressed by reference to an interest rate. Lessors pass down the risk of rate fluctuations by subjecting the rental payable to adjustments by reference to provisions in other documents (e.g., an adjustment letter linking rentals to LIBOR) or by cross-reference to another non-Islamic lease signed at the same time and the same rentals.

[13] Besides the option to (re)purchase the asset, the lessee can be given the right to sublet the asset. Moreover, the terms of the lease must be clearly identified, and the lease needs to be renewed for every rental payment if the rent is linked to LIBOR or some other market interest rate.

[14] If the underlying assets were originally held by the borrower, this arrangement represents a lease-back agreement over the term of the financing agreement to the borrower, who has the option to acquire the equipment after the lease expires.

[15] Possible ways of *ijarah*-compliant relief of the responsibility for the maintenance and insurance of leased assets by the lessor are: (i) the lessor agrees to perform insurance and maintenance, and to an increase of rental payments to recover insurance premium and appointment of lessee or third party as agent to acquire the insurance in return for a fee

(continued)

lease *(ij*a*rah wa iqtin*a*')*, such as an *Islamic mortgage*, the repayment through lease payments might also include a portion of the agreed resale price (in the form of a call option premium), which allows borrowers to gradually acquire total equity ownership for a pre-determined sales price.[17] If the lessee does not exercise the call option at maturity, the lender disposes of it in order to realize the salvage value (put option).[18] In an operating lease, the asset is returned to the borrower for the original sale price or the negotiated market price[19] unless otherwise agreed.[20] In this case, the lender's put option represents a repurchase obligation[21] by the borrower (at the current value of outstanding payments), which is triggered upon certain conditions, such as delinquent payments or outright default.

In Islamic *profit-sharing contracts* (equity-based), lenders (i.e., investors) and borrowers (i.e., entrepreneurs) agree to share any gains of profitable projects based on the degree of funding or ownership of the asset by each party. In a trustee-type *mu*d*araba (or mu*d*arabah)* financing contract, the financier *(rabb al m*a*l)* provides all capital to fund an investment, which is exclusively managed by the entrepreneur *(mu*d*arib)* in accordance with agreed business objectives. The borrower shares equity ownership with the financier (i.e., a call option on the reference assets) and might promise to buy-out the investor after completion of the project. At the end of the financing period, the entrepreneur repays the original amount of borrowed funds only if the investment was sufficiently profitable. Profits are distributed according to a pre-agreed rate between the two parties. Investors are not entitled to a guaranteed payment and bear all losses unless they have occurred due to

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commensurate to the insurance mark-up; or (ii) the lessor appoints the lessee or third party to discharge these duties for a fee. The degree of transfer of maintenance responsibility is reflected in the lease payments.

[16] Also note that in a headlease-sublease *ij*a*rah* transaction the legal title remains with the borrower, who leases the assets to the lender. This form of asset retention implies similar counterparty risk as with some types of debt-based Islamic finance (see below) unless the borrower enters into a guarantee agreement to repay the exercise price of the transferred asset on a dissolution event.

[17] This structural feature has been applied especially in Islamic mortgage deals in the U.S.

[18] In Figure 1, the temporary retention of asset ownership by lender in a lease contract represents a put option with a strike price on the present value of transferred assets.

[19] In contrast, debt-based contracts require a higher re-purchase price, which includes quasi-interest payments.

[20] The temporary transfer of stock ownership from borrower to lender pursuant to a repurchase agreement within a lease contract implies full collateralization if its value at the time of transfer equals the present value of the borrowed amount repayable at some future date. The lower the present value of the reference asset being funded by the contract, the lower the degree of collateralization.

[21] The repurchase obligation insulates the lender from the performance of the underlying asset.

misconduct, negligence, or violation of the conditions mutually agreed by both financier and entrepreneur.[22] The equity participation and loss sharing in a *mush_araka* (or *mush_arakah/musyarakah*) contract is similar to a joint venture, where both lender/investor and borrower (or asset manager/agent) jointly contribute funds to an existing *or* future project, either in form of capital or in kind, and ownership is shared according to each party's financial contribution. Although profit sharing is similar to a *mu_{da}rabah* contract, losses are generally borne according to equity participation.

Overall, the different basic types of Islamic finance combine two or more contingent claims to replicate the risk-return trade-off of conventional lending contracts or equity investment *without* contractual guarantees of investment return or secured payments in reference to an interest rate as time-dependent cost of funds. Such arrangements may become complicated in practice, once they are combined to meet specific investor requirements under Islamic law (El-Qorchi, 2005).

3. "IMPLICIT DERIVATIVES": IDENTIFICATION AND EVALUATION

3.1. Islamic Finance and Put-Call Parity

From an economic point of view, "creditor-in-possession"-based lending arrangements of Islamic finance replicate interest income of conventional lending transactions in a religiously acceptable manner. The concept of *put-call parity*[23] illustrates that the three main types of Islamic finance represent different ways to re-characterize conventional interest through the attribution of economic benefits from the (temporary) use and original ownership of an existing or future (contractible) asset (see Figure 1).

In *asset-based* Islamic finance for investment or trade, the borrower leases from the lender one or more assets *A* valued at *S*, which have previously been acquired from either the borrower or a third party. The lender entitles the borrower to (re-

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[22] This equity-based arrangement implies a non-recourse debt feature (see Figure 1).

[23] The relationship between the put and call values of a European option on a non-dividend paying stock of a traded firm can be expressed as $PV(E)+C=S+P$. $PV(E)$ denotes the present value of a risky debt with a face value equal to exercise price E, which is continuously discounted by $exp(-rT)$ at a risk-free interest rate r over T number of years. In our case of a lending transaction, the share price S represents the asset value of the funded investment available for the repayment of terminal value E.

)gain ownership of *A* at time *T* by writing a call option -*C(E)* with time-invariant[24] strike price *E* subject to the promise of full repayment of *E* (via a put option +*P(E)*) plus an agreed premium in the form of rental payments over the investment period. This arrangement amounts a *secured* loan with *fully collateralized* principal (i.e. full recourse). The present value of the lender's *ex ante* position at maturity is $L_1 = S - C(E) + P(E) = PV(E),$[25] which equals the present value of the principal amount and interest of a conventional loan.
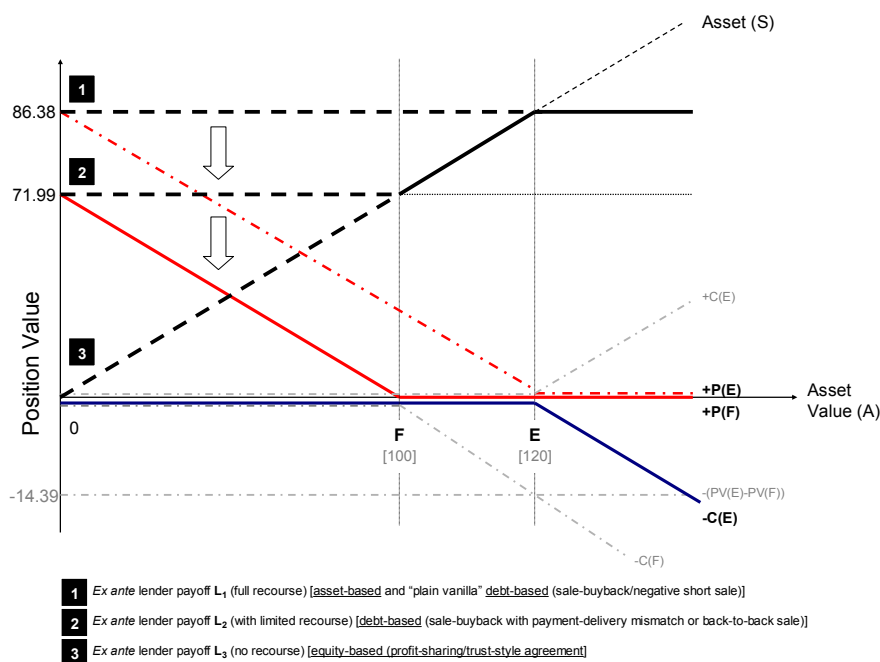

Figure 1. *Pay-off profile of all three basic forms of Islamic finance.*

In a more realistic depiction, the combination of a put and call option on the same strike price represents a *series of individual (and periodically extendible) forward contracts* on asset value *S* over a sequence of rental payment dates *t*, so that

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[24] This assumption contrasts with asset-based contracts that function as financing leases (e.g. Islamic mortgages), where the borrower reduces *E* by gradually acquiring complete equity interest over the duration of the transaction (see below).

[25] The lease payments received from the borrower wash out in this representation.

$$L_1' = S_T - \left(\frac{\sum_{t=1}^{T-1} C_{t,t+1}(E) - \sum_{t=1}^{T-1} P_{t,t+1}(E)}{\prod_{t=1}^{T} \left[(1+r_f)(1+\lambda)\right]^t} \right) = \underbrace{E\left[(1+r_f)(1+\lambda)\right]^{-T}}_{PV(E)}, \quad (1)$$

where r_f and λ denote the risk-free interest rate analog and the market price of risk[26] implicit in the pre-specified repayment of the lending transaction. Overall, the put-call arrangement of *asset-based Islamic lending implies a sequence of cash-neutral, risk-free (forward) hedges of credit exposure*. Since poor transparency of *S* in long-dated contracts could make the time value of +*P(E)* appear greater than its intrinsic value, long-term Islamic lending with limited information disclosure would require a high repayment frequency to ensure efficient investor recourse. In *debt-based* Islamic finance, borrower indebtedness from a sale-repurchase agreement ("cost-plus sale") of an asset with current value *PV(E)* implies a premium payment to the lender for the use of funds over the investment period *T* and the same investor pay-off L_1 as asset-based Islamic finance.[27]

However, some debt-based financing, such as *salam* or *istiṣnaʿ* imply counterparty and market risks from nonperformance and/or lost recovery value due to delayed investor recourse. If we assume that these contingency risks would translate into a mismatch of strike prices *F* and *E*, premium payments in a *salam* contract could increase by +*(C(F)-C(E))* in present value terms, while the put option value of investor recourse on some future asset in an *istiṣnaʿ* contract with deferred delivery may shed -*(P(F)-P(E))*. Hence, in the latter case, the reduced present value of repayment (or collateralization) for the desired funding limits the *ex ante* lender payoff to

$$L_2 = S - C(F) + P(E) = PV(E) - \left(PV(E) - PV(F)\right) + C(F) - C(E) \quad (2)$$

while a higher contingent claim of borrowers on the (re)purchase of the asset in the former case results in

$$L_2 = S - C(F) + P(E) = PV(E) - C(F) + C(E). \qquad (3)$$

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[26] We assume unity between the individual risk premium and the market price of risk in this case, i.e., the underlying asset is perfectly sensitive to changes of the market risk premium.

[27] However, some debt-based financing with deferred payment of future claims on existing assets *(salam)*, pre-delivery finance for future assets *(istiṣnaʿ)* or the deferred cost-plus sale of a third-party held asset imply counterparty and market risks from lost recovery value, which could translate a lower strike price *F* on the call or put option respectively.

In Islamic profit-sharing (*equity-based)* agreements, the lender receives a payout in accordance with a pre-agreed disbursement ratio only if the investment project generates enough profits to repay the initial investment amount and the premium payment at maturity *T*. Since the lender bears all losses, this equity-based arrangement precludes any recourse in the amount $+P(E)$ in absence of enforceable collateral. In the simplest case, the discrete form *ex ante* payoff of an investor with 100% equity interest would be

$$L_3 = S_T - \frac{\sum_{t=1}^{T-1} C_{t,t+1}(E)}{\prod_{t=1}^{T} \left(\left(1+r_f\right)\left(1+\lambda\right)\right)^t} = \underbrace{E\left(\left(1+r_f\right)\left(1+\lambda\right)\right)^{-T}}_{PV(E)} - \frac{\sum_{t=1}^{T-1} P_{t,t+1}(E)}{\prod_{t=1}^{T} \left(\left(1+r_f\right)\left(1+\lambda\right)\right)^t}. \quad (4)$$

The lender pay-off L_1'' from a "rent-to-buy" asset-based financing lease, which is particularly prominent in Islamic mortgage finance, is similar to pay-off L_3 above. In such contracts, borrowers gradually acquire all of the equity interest *S* as part of their periodic rental payments while renting the portion of the asset the lender still owns. Therefore, the strike price *E* of a sequence of individual put-call based forward contracts declines over time as the partial equity ownership of borrowers increases until they eventually acquire the underlying asset at maturity *T,* so that

$$L_1'' = S_T - \left(\frac{\sum_{t=1}^{T-1} C_{t,t+1}\left(E - t\frac{E}{T}\right) - \sum_{t=1}^{T-1} P_{t,t+1}\left(E - t\frac{E}{T}\right)}{\prod_{t=1}^{T} \left(\left(1+r_f\right)\left(1+\lambda\right)\right)^t}\right)$$

$$= \underbrace{E\left(\left(1+r_f\right)\left(1+\lambda\right)\right)^{-T}}_{PV(E)} - \frac{\sum_{t=1}^{T-1} P_{t,t+1}\left(t\frac{E}{T}\right)}{\prod_{t=1}^{T} \left(\left(1+r_f\right)\left(1+\lambda\right)\right)^t}. \quad (5)$$

3.2. Application of the Black-Scholes-Merton (BSM) Framework

The representation of lender payoffs under put-call parity permits the identification and exact valuation of all constituent components of Islamic finance contracts as balance sheet identities within the standard Black-Scholes-Merton (BSM) framework of capital structure-based *option pricing theory* (OPT) (Black and Scholes, 1973; Merton, 1973 and 1974). In the following section, we show how to derive the fair market price of Islamic lending transactions if the underlying

asset conforms to a lognormal asset process.[28] In particular, this approach allows us to characterize the implicit interest rate of Islamic lending as a result of the premium payments (i.e., periodic rental or lease payments) received by the lender in return for the call position on assets held by the borrower in Islamic finance.

According to Merton's reduced-form model, a firm's outstanding liabilities constitute a bankruptcy level ("default threshold"). Owners of corporate equity in leveraged firms hold a call option on the firm value after outstanding liabilities have been paid off. They also have the option to default if their firm's asset value ("reference asset") falls below the present value of the notional amount of outstanding debt ("strike price") owed to bondholders at maturity. So, corporate bond holders effectively write a European put option to equity owners, who hold a residual claim on the firm's asset value in non-default states of the world. Bond holders receive a put option premium in the form of a credit spread above the risk-free rate in return for holding risky corporate debt due to the limited liability of equity owners. The value of the put option is determined by the duration of debt claim, the leverage of the firm, and asset-price volatility.

The BSM approach assumes that the firm's debt consists of a zero-coupon bond *B* with a notional value *F* and a maturity term of *T* periods. The firm's outstanding liabilities constitute the bankruptcy level, whose standard normal density defines the "distance to default" relative to the firm value. This capital-structure-based evaluation of contingent claims on firm performance under the risk neutral measure implies that a firm defaults if its asset value is insufficient to meet the amount of debt owed to bondholders at maturity. Conversely, if the "distance to default" is positive, and the asset value of the firm exceeds the bankruptcy level, the call option held by equity holders on firm value has intrinsic value (in addition to its time value until the maturity of debt). The same logic can be readily applied to pricing singular Islamic finance transactions.

The BSM model assumes that market price *S* of the underlying asset evolves following the stochastic differential equation of asset price dynamics

$$dS_t/S_t = r_S dt + \sigma dW_t \tag{6}$$

with drift r_S and diffusion defined by a standard *geometric Brownian motion* (GBM) $\Delta W_t \sim \varphi(0, \Delta t)$ with Wiener process $z \sim \varphi(0, \sigma)$ of instantaneous asset

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[28] Note that the use of the BSM framework appeals to universal recognition, but fails to generate accurate option prices in times when extreme outcomes occur amid periods of high volatility unless the normality assumption of asset price dynamics underpinning the "default trigger" of the distance to default measure (see below) is altered.

value change. After application of Ito's Lemma, the discrete form analog of equation (4) for initial value S_0 can be written as a lognormal asset process

$$\ln S_t - \ln S_0 \sim \phi\left[\ln S + \left(r_S - \sigma_S^{2}/2\right)t; \sigma_S^{2}\sqrt{t}\right], \tag{7}$$

where $\phi(.)$ is the standard normal density function. (7) defines the physical probability distribution of the end-of-period value S_T,

$$S_T \sim S_0 \exp\left\{\left(r_S + \sigma_S^{2}/2\right)T + \sigma_S \sqrt{T}z\right\}, \tag{8}$$

based on

$$S_t = S_0 \exp\left\{\left(r_S + \sigma_S^{2}/2\right)t + \sigma W_t\right\}. \tag{9}$$

Analogous to firm leverage $d = De^{-rt}/V$ as the ratio of the discounted face value of outstanding debt D and the asset value V of the firm in the original BSM, we define the default barrier as the ratio $b = Ee^{-r_f t}/S$ of the future repayment amount E, discounted at the risk-free rate of return r_f, and asset value S.[29] Hence, the expected *(physical)* probability of default (or *expected default frequency* (EDF)) $P_t = \Pr\left(S \le Ee^{-r_f t}\right) \approx \Pr\left(\ln S \le \ln Ee^{-r_f t}\right)$ at time t is defined as

$$
\begin{aligned}
P_t &= \Phi\left(\left(\ln Ee^{-r_f t} - \left(\ln S_t - \left(r_S - r_{div} + \sigma_S^{2}/2\right)t\right)\right)\Big/\sigma_S \sqrt{t}\right) \\
&= \Phi\left(\left(\ln b + \left(r_S - r_{div} + \sigma_S^{2}/2\right)t\right)\Big/\sigma_S \sqrt{t}\right) \equiv \Phi(-d_1) = 1 - \Phi(d_1),
\end{aligned} \tag{10}
$$

with an internal rate of return r_{div} ("dividend yield"), the standard normal cumulative distribution function $\Phi(.)$, and the *distance to default* (DD) measure

$$
\begin{aligned}
d_1 &\equiv \left(\ln\left(S_t/Ee^{-r_f t}\right) + \left(r_S - r_{div} + \sigma_S^{2}/2\right)t\right)\Big/\sigma\sqrt{t} \\
&= \left(\ln(-b) + \left(r_S - r_{div} + \sigma_S^{2}/2\right)t\right)\Big/\sigma\sqrt{t},
\end{aligned} \tag{11}
$$

---

[29] The repayment obligation is defined as the discounted the future value of repayment E of face value F and all coupon values in line with the conventional application of BSM.

whose probability density $\Phi\left(d_1\right)=1-P_t=\Pr\left(S>Ee^{-r_f t}\right)\approx\Pr\left(\ln S>\ln Ee^{-r_f t}\right)$ defines the "survival probability".

We expand equations (10) and (11) under the risk-neutral measure to take into account the asset-specific spread μ_S-r_f for the market price of risk (and asset volatility σ_S) in addition to the continuous time risk-neutral return r_f, which compensates for expected default. Thus, the *risk-neutral* probability of default (RNPD) is

$$
\begin{aligned}
P_t^Q &= 1-\Phi\left(\Phi^{-1}\left(\Phi\left(-d_1\right)\right)+\left(\mu_S-r_f\right)\sqrt{t}\big/\sigma_S\right)\\
&= \Phi\left(-\left(\Phi^{-1}\left(\Phi\left(-d_1\right)\right)+\left(\mu_S-r_f\right)\sqrt{t}\big/\sigma_S\right)\right)=\Phi\left(-d_1'\right),
\end{aligned}
\tag{12}
$$

based on the revised DD measure

$$
d_1' = \Phi^{-1}\left(\Phi\left(-d_1\right)\right)+\left(\mu_S-r_f\right)\sqrt{t}\big/\sigma_S ,
\tag{13}
$$

According to the continuous time CAPM,

$$
\mu_S-r_f = \beta\lambda ,
\tag{14}
$$

with asset beta

$$
\beta = \operatorname{cov}\left(r_S,r_m\right)\big/\sigma_m^2 = \rho_{S,m}\,\sigma_S\big/\sigma_m ,
\tag{15}
$$

where r_S and r_m denote the continuous time rate of return on the asset and a comparable market portfolio, σ_m is the volatility of the return of the market portfolio, $\rho_{S,m}$ is the correlation between both asset and market returns, and "market risk premium"

$$
\lambda = \mu_m-r_f ,
\tag{16}
$$

where μ_m denotes the continuous time expected rate of return on the market portfolio. Thus, the combination of equations (14)-(16) above yields

$$
\left(\mu_S-r_f\right)\big/\sigma_S = \beta\lambda\big/\sigma_S = \rho_{S,m}\lambda\big/\sigma_m = \rho_{S,m}SR ,
\tag{17}
$$

where the market Sharpe ratio $SR = \lambda/\sigma_m$, i.e., the excess return per unit of market volatility for the market portfolio. After substituting (17) into (13), so that

$$d_1' = \Phi^{-1}\left(\Phi\left(-d_1\right)\right) + \rho_{S,m} SR\sqrt{t} , \tag{18}$$

where $\rho_{S,m}$ is estimated as the square root of the residual sum of squares (R^2) of the linear regression of asset returns on market returns

$$r_S = \alpha + r_m + \varepsilon , \tag{19}$$

with constant α and error term ε.

If these conditions hold, default occurs if the asset value S falls below the repayment value E and the call option on future repayment E

$$C(E) = S_t e^{-\mu_1 t} \Phi\left(d_1'\right) - E e^{-\mu_2 t} \Phi\left(d_2'\right) , \tag{20}$$

represents the fair market value of each rental or lease payment in debt- and asset-based contracts or the periodic profit pay-out in equity-based Islamic transactions at each time period t, where $\mu_1 = \left(1 + r_{div}\right)\left(1 + \mu_S - r_f\right) - 1$ and $\mu_2 = \left(1 + r_f\right)\left(1 + \mu_S - r_f\right) - 1$ are the internal rate of return and the risk-free rate under the risk-neutral measure respectively and $d_2' = d_1' - \sigma_S \sqrt{t}$.

3.3. Application of adapted BSM to put-call parity

Since the present value $PV(E) = E e^{-\mu_2 t}$ and asset price S at time t are given, we can solve for $P(E) = PV(E) + C(E) - S_t$ under put-call-parity, and identify all components of an Islamic transaction, given

$$C(E) = \frac{E e^{-\left(\left(1 + r_f\right)\left(1 + \mu_S\right) - 1\right)t} - P(E)}{\left(\Phi\left(d_1\right) - b\Phi\left(d_2\right)\right)^{-1} - 1} , \tag{21}$$

which implies the declining positive correlation of the call option value *C(E)* and Islamic debt $PV(E) - P(E) = S_t - C(E)$ as $t \to T$. We finally derive the annual, continuously compounded interest rate as

$$r' = \frac{E}{\sqrt[T]{S_t - C(E)}} - 1. \qquad (22)$$

Given lack of suitable market prices in Islamic finance, the current asset price *S* (and attendant return r_S and volatility σ_S^2) can also be derived from a *mark-to-market* (MTM) exercise, internal audits or some other verification process. Similarly, the continuous time rate of return r_m and the volatility σ_m^2 of the market portfolio needs to be obtained from a pool of reference obligations, such as publicly quoted Islamic funds or other investments, which serve as pricing benchmark.

3.4. Numerical Example

We calculate the conventional rate of return r' under the risk neutral measure for a notional amount of *F*=100 of issued debt with future repayment *E*=120 and a tenor *T* of five years, discounted in continuous time at $\mu_2 = (1 + r_f)(1 + \mu_S) - 1 = (1.05 * 1.015) - 1 = 6.575\%$, so that present value $PV(E) \approx 86.38$ and $PV(E) \approx 71.99$ of full repayment and partial repayment of the principal amount only (see Figure 1). We assume risk-neutral return $\mu_S = 6.5\%$, standard deviation $\sigma_m = 10\%$ of market returns, and $\text{cov}(r_S, r_m) = 0.005$, so that asset beta $\beta = 0.5$, $\rho_{S,m} = 1/3$, and $SR = 0.3$. For asset value $S_0 = 100 = F$ (assuming that the firm is fully leveraged and firm value at inception *t=0* is equivalent to the notional amount *F*) and a standard deviation σ_S of 15%,[30] the fair market price of the Islamic lending contract would be 89.93, which implies an annual interest rate of $r' = 6.18\%$ according to our OPT-based valuation model if we assume dividend yield $r_{div} = 0\%$.

4. ISLAMIC FINANCE AND STRUCTURED FINANCE

Based on the above put-call parity replication of state-contingent payoffs of underlying asset performance, any form of Islamic finance could be considered a structured finance transaction, which contains implicit derivative elements with unilateral deferral of settlement and a double coincidence of obligations.

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[30] Empirically, the value of the assets of the firm can be estimated using by discounting the expected cash flows from the assets at the cost of capital.

Structured finance encompasses all financial instruments – other than individual (basic or exotic) derivative contracts – that serve to hedge any activity beyond the scope of conventional forms of on-balance sheet securities (debt, bonds, equity). They either (i) combine traditional asset classes with contingent claims, such as derivative claims on commodities, currencies or receivables from other reference assets, or (ii) replicate traditional asset classes through synthetication or new financial instruments (Jobst, 2007a). Structured finance offers the issuers enormous flexibility to create securities with distinct risk-return profiles in terms of maturity structure, security design, and asset types, which allows issuers to provide enhanced return at a customized degree of diversification commensurate to an individual investor's appetite for risk. Hence, structured finance contributes to a more complete capital market by offering any mean-variance trade-off along the efficient frontier of optimal diversification at lower transaction cost. However, the increasing complexity of the structured finance market, and the ever growing range of products being made available to investors, invariably create challenges in terms of efficient assembly, management and dissemination of information.

The flexible nature of structured finance straddles the indistinct boundary between traditional fixed income products, debentures and equity on one hand and derivative transactions on the other hand. Notwithstanding the perceivable ostensible difficulties of defining structured finance, a *functional* and *substantive* differentiation informs a useful demarcation between the most salient properties of structured and conventional forms of finance as regards the role of Islamic finance. The following definition reflects such a proposition if we compare two cases:

a) Investment instruments are motivated by the *same or similar financial objective* from both the issuer's and the investor's point of view, but *differ in legal and functional implementation* (transaction structure/security design/repayment profile) and substantive. They also might require a *different valuation*.[31]

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[31] *Pure credit derivatives* are clear examples of structured products, which allow very specific and capital-market priced credit risk transfer. Credit insurance and syndicated loans share the same financial objective; however, they do *not* constitute an arrangement to create a new risk-return profile (and possibly unfunded) from existing or future reference assets. In the same vein, *mortgage-backed securities* (MBSs) and (*Pfandbrief*-style) covered mortgage bonds represent different functional and legal methods of securitization with the same financial objective. Although both refinancing techniques convert homogenous pools of mortgage claims into negotiable securities, they represent two distinct forms of debt securities issued on the same type of underlying reference asset either off-balance sheet *(asset-backed securitization)* or on-balance sheet (covered mortgage bond).

b) Investment instruments are motivated by the *same or similar financial objective* and are *substantively and functionally equivalent* (i.e. they share a close equilibrium price relation), but *differ in their legal classification*.

In the second case appeals to the characteristics of Islamic finance, which fall squarely within the domain of structured finance instrument whenever religious constraints require the replication of conventional interest-bearing assets through structural arrangements of two or more contingent claims in the form of "implicit derivatives". Although both Islamic and conventional finance are *in substance equivalent to conventional finance* and yield the same lender and investor pay-offs at the inception of the transaction, they require a different valuation due to dissimilar transaction structures (and associated legal enforceability of investor claims) and/or security design.

5. "EXPLICIT DERIVATIVES" IN ISLAMIC STRUCTURED FINANCE: CREDIT RISK TRANSFER

There is wide agreement that derivatives with the option of unilateral deferment (and attendant contingency risk), such as delayed payment contracts on existing assets *(salam)* or purchase order *murabahah* contracts on future assets *(istisna)*, concur with Shariʿah principles. However, the deferment of obligations by *both* parties to a future date is considered tantamount to a debt exchange without underlying asset transfer, which implies the possibility of profit-taking and excessive uncertainty *(gharar)* of a kind that is not permissible under Islamic law. However, the prevalence of Shariʿah-compliant securitized issuance (in combination with hedging transactions) demonstrates the possibility of mutual risk transfer mechanisms with a view to foster *halal* in the spirit of distributive justice and the consideration of public interest *(maslahah)*. In conventional structured finance, the two major asset classes of *capital market-based risk transfer* (except loan sales, asset swaps, and natural hedges through bond trading) include *asset securitization* (which is mostly used for funding purposes) and *credit derivative* transactions (as hedging instruments), which permit issuers to devise almost an infinite number of ways to combine various asset classes in order to both transfer asset risk between banks, insurance companies, other money managers and non-financial investors in order to achieve greater transformation and diversification of risk.

Since most Islamic financial products are based on the concept of asset backing, the economic concept of asset securitization is particularly amenable to the basic tenets of Islamic finance. Asset securitization describes the process and the result of issuing certificates of ownership as pledge against existing or future cash flows from a diversified pool of assets ("reference portfolio") to investors. It registers as an alternative, capital market-based refinancing mechanism to diversify external

sources of asset funding in lieu of intermediated debt finance based primarily on the risk assessment of securitized assets. The implicit risk transfer of securitization does not only help issuers improve their capital management, but also allows issuers to benefit from enhanced liquidity and more cost efficient terms of high-credit quality finance without increasing their on-balance sheet liabilities or compromising the profit-generating capacity of assets. Investors in securitization have a wider choice of high-quality investments at their disposal, whose market valuation engenders greater overall efficiency and liquidity of capital markets. The tradability of securitized asset risk also facilitates the synthetic assembly and dynamic adjustment of asset portfolios via secondary markets according to investor preferences (Jobst, 2006a and 2006b).

In the wake of rapid growth of the Islamic finance sector[32], structured finance instruments have been receiving increasing attention in Islamic countries owing in large part to enabling capital market regulations, a favorable macroeconomic environment, and financial innovation aimed at establishing Sharīah compliance. As one form of structured finance, Islamic securitization transforms *bilateral risk sharing* between borrowers and lenders in Islamic finance into the *market-based refinancing* of one of the three broad types of Islamic finance (asset, debt, and equity-based) as reference asset. In its basic concept, Islamic securitization allows originators sell existing or future revenues from lease receivables (asset-based), "sale-back profit" (debt-based) or private equity from a portfolio of Islamically acceptable assets to a *special purpose vehicle* (SPV),[33] which refinances itself by issuing unsecured securities to market investors, which assume the role of a "collective financier" whose entrepreneurial investment does not involve guaranteed, interest-based earnings. In this context, investors represent the "capital market corollary" to a singular lender in ordinary Islamic finance. Irrespective of religious conditions, Islamic securitization offers the same economic benefits conventional structured finance purports to generate, such as the active management of designated asset portfolio due to greater control over asset status, enhanced asset-liability management and term structure transformation, as well as the isolation of certain assets in order to make them self-financing at a fair market rate (see Box 1).

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[32] The outstanding stock of sharīah assets worldwide has been increasing by an average of 15 percent a year since 2003 and stood at about U.S.$500 billion at end-2006, about half of which is held by Islamic banks. Global volume could increase even faster in response to surging demand from Muslim investors flocking to the growing number of competing Islamic investment products.

[33] In conventional securitization, a SPV is set up solely for the purpose of the securitization and might be a trust, limited liability company, partnership, or a corporation. In Islamic securitization, the objectives set out in the constitutional documents of the SPV also must not infringe on the prohibition of *ribā* and *harām* under Islamic law.

Although the religious prohibition of the exchange of debt and the required conferral of ownership interest to participate in business risk still poses challenges to the development of Islamic securitization, the gradual acceptance of Islamic investment certificates, so-called *sukuk* bonds, represents a successful attempt to overcome these impediments based on the adequate interpretation and analogical reasoning of Shariah principles applied in Islamic finance. *sukuks* are Shariah-compliant and tradable asset-backed, medium-term notes,[34] which have been issued internationally by governments, quasi-sovereign agencies, and corporations after their legitimization by the ruling of the *Fiqh Academy* of the *Organization of the Islamic Conference* in February of 1988.[35] Over the last five years, the *sukuk* has evolved as the most popular form of securitized credit finance within capital-market-based Islamic structured finance, reconciling the concept of securitization *and* principles of the Shariah law on the provision and use of financial products and services in a risk-mitigation structure subject to competitive pricing.[36] The *Accounting and Auditing Organization of Islamic Finance Institutions* (AAOIFI) currently recognizes 14 different types of *sukuks*, which are traded on the *Scripless Securities Trading System* (SSTS)[37] in Malaysia. Gross securitized issuance of these Islamic debt securities has nearly quadrupled over the past two years, rising from U.S.$7.2 billion in 2004 to over U.S.$27 billion in 2006 – but still only little more than one tenth of conventional securitized issuance of *asset-backed securities* (ABS) in emerging markets over the same time period. During the first half of 2007, greater standardization triggered a further uptick of issuance volume to more than U.S.$10 billion. According to recent market reports governments and corporates will raise about U.S.$30 billion in *sukuk* over the next three years, bringing the size of the Islamic securitization market to U.S.$100 billion.

sukuk notes convey *equity* interest to (capital market) investors in the form of a *call option* on partial or complete ownership of underlying reference assets, including the right to some calculable rate of return as a share of profit *(secondary notes)* and the repayment of the principal amount *(primary notes)*. *sukuks* operate

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[34] "Investment *sukuk* are certificates of equal value representing undivided shares in ownership of tangible assets, usufructs and services or (in the ownership of) the assets of particular projects or special investment activities." (AAOIFI Standard No. 17).

[35] Although there is no formal obligation of compliance associated with the ruling, it carries considerable weight with most Islamic financial institutions.

[36] Only appropriate Islamic bodies, so-called Shariah boards, may adjudicate the shariah compliance of the terms of any *sukuk* issuance.

[37] The SSTS is a system operated by the *Bank Negara Malaysia* (BNM)'s real time gross settlement/delivery-versus-payment system through which sovereign and unlisted corporate bonds are registered, cleared, and settled via the *Real-time Electronic Transfer of Funds and Securities* (RENTAS), Malaysia's scripless book-entry securities trading and funds transfer system. SSTS also maintains securities accounts for financial institutions.

similarly to mortgage pass-through except investors own a portion of the underlying assets that collateralize debtor repayments. However, the scrutiny of securitized collateral is more complicated and less accurate when there is a requirement for Sharīah compliance of assets. Most Islamic finance products require issuers to originate own Islamically acceptable assets (rather than buy asset pools in the market) due to the absence of eligible collateral assets.[38] Moreover, the comparative paucity of historical data on defaults hinders reliable estimates for recovery rates used in pricing and rating tranched products, and leads rating agencies to use very conservative assumptions, especially if lender credit scoring and infrastructure are not up to the standards usually sought by the rating agencies.

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[38] This would make Islamic ABS a secondary tool and not primary tool to service/underwrite third-party financial institutions; however, it holds the prospect of restructuring non-sharīah-compliant assets into permissible investments.

Box 1. *East Cameron Gas sukuk* **- credit risk transfer and commodity hedging in Islamic finance**

The first Islamic securitization transaction in the U.S. demonstrates the Sharīʿah-compliant use of derivatives in structured finance. In July 2006, *East Cameron Partners* (ECP), an independent oil and gas exploration and production company based in Houston, Texas, raised U.S.$165.67 million from the issuance of a *sukuk al-musharakah* backed by natural oil and gas royalties.

Its two-tier securitization structure, which was designed by arrangers Beirut-based *Bemo Securitization* (BSEC) and *Merrill Lynch*, consists of a "purchaser SPV" (incorporated in Delaware), which acquires the underlying assets, and an "issuer SPV", registered in the Cayman Islands, which funds the asset purchase by issuing investment trust certificates (*sukuk* notes). The relationship between both SPVs is governed by a "funding agreement", which includes periodic funding repayments and the transfer of net profits. The funding agreement aims at materializing the contribution of the "issuer SPV" (as a *musharek*) and (ii) conveying to the "issuer SPV" a certain risk and reward profile, which is passed on to the *sukuk* note holders, pursuant to the following provisions: (i) the purchase of *overriding royalty interest* (ORRI) from the originator for U.S.$113.84 million, (ii) the payment of the development plan for U.S.$38.28 million, (iii) the funding of the reserve account with an initial balance of U.S.$9.5 million, and (iv) the acquisition of natural gas put options for U.S.$4.05 million in a specific hedge agreement with an outside party. The commodity price hedge as part of the funding agreement to protect investor interest is remarkable in the context of Islamic finance. The hedge constitutes a Sharīʿah-compliant obligation *(iltizam)*, since it confers true commercial value (rather than speculative interest).

Overall, Sharīʿah compliance of the transaction is established by the uncertainty of cash flows from the asset performance of permissible real economic activity with identified and direct investor participation, which does not imply the payment or receipt of any interest guarantee. While deferrals are possible, in the default event, investors have recourse to the underlying assets and can force the sale of the cash flow generating assets. However, legal risk from Islamic jurisprudence could affect the legal enforceability of the funding arrangement and the asset control of investors.

6. ASSESSMENT OF DERIVATIVES IN ISLAMIC FINANCE

6.1. Discussion of Current Legal Opinion

Amid weak reliance on capital market financing in many Islamic countries, risk transfer mechanisms, be it *sukuk* issuance or hedging tools, are subject to several critical legal hindrances that impact on the way derivatives redress perceived market imperfections and financing constraints. While "implicit derivatives" are essential to the replication of interest through profit generation from temporary asset transfer or profit-sharing in Islamic finance (see above), and thus are not deemed objectionable on religious grounds, the *explicit* use of derivatives remains highly controversial.

In the "implicit derivative" transaction underlying basic Islamic finance is tantamount to a forward contract. Nontheless, the forward element of Islamic lending contracts – like conventional forwards – involves problems of double coincidence and counterparty risk due to privately negotiated customization. Parties to forward agreements need to have exactly opposite hedging interests, which coincide in timing of protection sought against adverse price movements and the quantity of asset delivery. Moreover, forward contracts elevate the risk of one counterparty defaulting when the spot price of the underlying asset falls below the forward price (i.e. the originally agreed upon price) prior to maturity, rendering the contract "out-of-the-money" and making deliberate default more attractive. Although the non-defaulting party does have legal recourse, the process of seeking contractual enforcement can be lengthy, cumbersome and expensive, especially in areas of conflicting legal governance as a *matter of form* (commercial law vs. Islamic law).

These obvious shortcomings of forwards create the economic rationale for futures, which are standardized forward contracts in terms of size, maturity and quality, and, thus do away with the constraint of double coincidence in forward contracts. However, generic future contracts appear to contravene shariah principles in the way they limit counterparty risk. Futures are generally priced *marked-to-market* (MTM) [39], which requires margin calls from the party that is out-of-the-money. Since the absence of underlying asset transfer renders MTM pricing unacceptable under Islamic law, a shariah-compliant solution to this problem could

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[39] MTM defines the process of constantly monitoring the variations to contingencies (e.g. market conditions, micro and macro economic indicators, price volatility, quality considerations, political risk, etc.) pertaining to a forecasted spot price (i.e., expected future price) of an asset on a specified delivery date in order to price a derivative contract. For instance, if the asset price falls below (increases above) the contracted strike price a call option would be "out-of-the-money" ("in-the-money").

be the marginal adjustment of periodic repayment amounts in response to any deviation of the underlying asset value from the pre-agreed strike price at different points in time throughout the term of the transaction (see above).

But conventional futures still imply contingency risk. Options redress the exposure to discretionary non-performance in return for the payment of an upfront, non-refundable premium. Holders of a call option have the right (but not the obligation) to acquire the underlying asset, which could otherwise only be exercised by the purchase of the underlying asset at the prevailing spot price. Therefore, options do not only serve to hedge adverse price movements, but they also cater for contingencies regarding the delivery or receipt of the asset and offer the opportunity to take advantage of favorable price movements.

While the premise of eliminating contingency risk is desirable *per se* under Islamic law, the assurance of definite performance through either cash settlement (in conventional futures) or mutual deferment (in options) supplants asset recourse and implies a zero-sum proposition, which are not considered shariah-compliant. Instead, in Islamic finance, the bilateral nature and asset-backing *ensure definite performance* on the delivery of the underlying asset (unlike a conventional forward contract).[40] Since Islamic creditors hold legal title to the underlying asset, the sequence of periodic and maturity-matched put-call combinations preserves equitable risk sharing consistent with the shariah principles of unsecured entrepreneurial investment due to certain asset delivery – without objectionable zero-sum gains. Unlike in conventional options, there are no unilateral gains from favorable price movements (e.g., "in-the-money" appreciation of option premia) in the range between the current and the contractually agreed repayment amount. Any deviation of the underlying asset value from the final repayment amount constitutes shared business risk. By virtue of holding equal and opposite option positions on the same strike price, both creditor and debtor are obliged to honor the terms of the contract irrespective of changes in asset value, without the opportunity of the creditor (debtor) to benefit from a higher (lower) asset price at maturity.

In the light of the Islamic principle of permissibility (*ibaḥah*), which renders all commercial transactions Shariah-compliant in the absence of a clear prohibition, current objections to futures and options constitute the most discouraging form of religious censure (*taqlīd*). Shariah scholars take issue with the fact that these derivatives are valued mostly by reference to the sale of a non-existent asset or an asset not in the possession *(qabḍ)* of the seller, which negates the *ḥadīth* "sell not

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[40] In a multilateral set-up with many market participants, nonetheless, only options, which offer the right (but not the obligation) to sell or buy an asset at an agreed strike price until the maturity date, cater for contingent scenarios.

what is not with you." Sharī‘ah principles require creditors (or protection sellers) to actually own the reference asset at the inception of a transaction. The absence of a legalistic cause *(‘illah)* leading to contingency risk in forwards and futures has led commentators to dispute their general permissibility under Islamic law. That said, the prospect of failure to deliver (and the resultant notion that a purchase or sale cannot be effected for a future date) might have been more relevant to the condition of asset ownership in the past, when then simple, primitive and unorganized capital markets implied considerable counterparty risk on contractual performance.

Futures and options also continue to be rejected by a majority of scholars on the grounds that "... in most futures transactions delivery of the commodities or their possession is not intended" (Usmani, 1996), which would invalidate their use under Sharī‘ah law. Furthermore, derivatives almost never involve delivery by *both* parties to the contract. Often parties reverse the transaction and cash settle the price difference only, which transforms a derivative contract into a paper transaction without the element of a genuine sale. Thus, a key argument against the use of derivatives contents the valuation of derivatives based on the sale of a non-existent asset or an asset not in the possession *(qabḍ)* of the seller, which negates the *ḥadīth* "sell not what is not with you." Sharī‘ah principles require creditors (or protection sellers) to actually own the reference asset at the inception of a transaction. The absence of a legalistic cause *(‘illah)* leading to contingency risk in forwards and futures has led commentators to dispute their general permissibility under Islamic law. That said, the prospect of failure to deliver (and the resultant notion that a purchase or sale cannot be effected for a future date) might have been more relevant to the condition of asset ownership in the past, when then simple, primitive and unorganized capital markets implied considerable counterparty risk on contractual performance.

Besides the lack of asset ownership at the time of sale, other areas of concern shared by Islamic scholars about Sharī‘ah compliance of derivatives have centered on: (i) the selection of reference assets that are nonexistent at the time of contract; (ii) the requirement of *qabḍ* (i.e., taking possession of the item prior to resale); (iii) mutual deferment of both sides of the bargain, which reduces contingency risk but turns a derivative contract into a sale of one debt for another; and (iv) excessive uncertainty or speculation that verges on gambling, resulting in zero-sum payoffs of both sides of the bargain (Kamali, 2007).

Although Khan (1995) concedes that even in the contemporary form of futures trading "some of the underlying basic concepts as well as some of the conditions for such trading are exactly the same as [the ones] laid down by the Prophet [Mohammed *(sallallâhu 'alayhi wasallam)*] for forward trading," he attests to the

associated risk of exploitation and speculation, which belie fundamental precepts of the Shariah.[41] For the same reasons, several scholars also consider options in violation of Islamic law. Nonetheless, in one of the most comprehensive study on the subject so far, Kamali (2001) finds that "there is nothing inherently objectionable in granting an option, exercising it over a period of time or charging a fee for it, and that options trading like other varieties of trade is permissible *mubah*, and as such, it is simply an extension of the basic liberty that the Qur'an has granted." With that in mind, strong opposition to derivatives seems to be inherited from a pathology of religious interpretation that turns a blind eye to the fact that derivatives are a new phenomenon in an Islamic context. The governance of derivatives has no parallel in the conventional law of *muamalat*, and should therefore be guided by a different set of rules.

6.2. Legal Uncertainty

Derivative transactions in Islamic financial systems are beset by legal uncertainty from the heterogeneous assessment of Shariah compliance, which entails procedural and substantive difficulties. The absence of practical and hard-wired guidance on Shariah compliance affects the legal integrity and restitution interest of parties to derivative transactions. Islamic jurisprudence is not definite or bound by precedent and still lacks of homogeneous interpretation and universal recognition. Legal opinions of Islamic courts may deviate from previous decisions made by other Shariah scholars. Since Islamic law itself is divided in different juristic schools of thought *(madhahib)*, which provide guidance on the interpretation *(ijtihad)* or analytical reasoning *(qiyas)* of the general principles of the Shariah, there is no consistent ruling of Islamic courts on the religious compliance of the eligibility of certain assets and transaction structures for securitization. For instance, even though the *hanbali* school is dominant in Saudi-Arabia, a Shariah board has considerable discretion in the interpretation of Islamic law and may choose any other school of thought to inform their decision-making process. Therefore, it its hardly surprising that the adjudication of derivatives under Islamic law varies greatly and differ in terms of individual interpretations of the Shariah and the fundamental understanding of the economic purpose of the respective instrument (and transaction structure) under discussion. The resultant inconsistency of legal opinions has raised doubts about the general permissibility of derivative instruments in Islamic finance, which bear the potential of flouting the Shariah ban on speculation and capital gains without underlying asset transfer.

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[41] Khan (1995) substantiates the permissibility of futures contracts based on "clear sayings" of the Prophet Mohammed, which stipulate that a forward trade *(salaf)* should be completed for a specific quantity, specific weight and for a specific period of time – much like a modern day futures contract.

6.3. Investor Protection

Islamic investors are not only concerned with the compliance of derivative transactions with the Shar̄ı[ah, but also their legal enforceability under contract law. So from an investor's perspective, Islamic derivatives need to satisfy *two* legal regimes: applicable commercial law as well as Islamic law. Eventually, the question of whether Islamic law governs a transaction by *substance* or *form* determines the investment risk from religious encroachment on the economic logic of the security design and the legal enforceability of commercial interests. If Shar̄ı[ah compliance is treated as a *matter of substance* and upholds in spirit what was created in form (as defined by commercial law), the violation of any religious precepts is likely to temper investor interest and affect liquidity, but would not preclude legal enforceability of investor claims. However, if Islamic law is the governing law as a *matter of form* (i.e., the transaction is governed solely by Shar̄ı[ah law), the opinion of Shar̄ı[ah courts could override commercial legal concepts and re-qualify the legal nature of derivative contracts. For instance, the *ex post* legal interpretation of certain security features carries the possibility of bankruptcy courts or insolvency officials in Islamic jurisdictions to invalidate post-default settlement protocols under commercial law or "re-characterize" a derivative transaction as speculation or debt exchange without transfer of legal title to the lender, which, in turn, interferes with the premise of asset transfer in Islamic finance. Either outcome would undermine the economic purpose of derivatives, compromise investor protection, and upset the carefully constructed profit and loss sharing amongst investors, which effectively defines the transaction structure. Such legal uncertainty is amplified by that fact that bankruptcy and dispute resolution processes of Islamic securities are largely untested due to scarcity of default cases.

6.4. Possibilities to Establish Shar̄ı[ah Compliance of Derivatives

The heterogeneity of scholastic opinion about the Shar̄ı[ah compliance of derivatives is largely motivated by individual interpretations of the Shar̄ı[ah and different knowledge about the mechanics of derivative structures. Many policy makers, market participants and regulators are frequently unfamiliar with the intricate mechanics and the highly technical language of many derivative transactions, which hinder a more comprehensive understanding and objective appreciation of the role of derivatives in the financial system and their prevalence in a great variety of business and financial transactions.

While Islamic regulators have a natural interest to err on the side of caution when attempting to resolve religious impediments to the use of derivatives under Islamic jurisdiction, they have come to realize the numerous benefits of derivative markets. Risk diversification through derivatives improves stability at all levels of the financial system and enhances general welfare. Derivatives also contribute to

continuous price formation, enhance liquidity management and supplement cash markets at lower funding cost. Last but not least, as a critical element of capital market development, derivatives ensure an efficient transmission of funds from lender to borrowers while enhancing sound financial planning and financial stability. The absence of suitable risk transfer mechanisms under Islamic law, however, deprives financial institutions of this array of these advantages.

In principle, futures and options may be compatible with Islamic law if they (i) are employed to address genuine hedging demand on asset performance associated with direct ownership interest, (ii) disavow mutual deferment without actual asset transfer, and (iii) eschew avertable uncertainty *(gharar)* as prohibited sinful activity *(ḥarām)* in a bid to create an equitable system of distributive justice in consideration of public interest *(maṣlaḥah)*. Sharīʿah-compliant derivatives would also maintain risk sharing between contract parties by forgoing the zero-sum proposition of many conventional derivative transactions in favor of win-win situations from changes in the value of the underlying asset. For instance, the issuance of stock options to employees would be an ideal candidate for a Sharīʿah-compliant derivative. By setting incentives for higher productivity firm owners reap larger corporate profits that offset the marginal cost of greater employee participation in stock price performance. However, the *de facto* application of many derivative contracts is still objectionable, mainly because of the possibility of speculation (or deficient hedging need)[42] and the absence of entrepreneurial investment violate of the tenets of distributive justice and equal risk sharing subject to religious restrictions on the sale and purchase of debt contracts as well as profit taking without real economic activity and asset transfer.

7. THE PROSPECTS OF ISLAMIC DERIVATIVES

Recent efforts of regulatory consolidation and standard setting have addressed economic constraints and the legal uncertainty imposed by both Islamic jurisprudence and poorly developed uniformity of market practices. Therefore, market inefficiencies caused by heterogeneous prudential norms and diverse interpretations of Sharīʿah compliance are expected to dissipate in the near future. In the area of banking regulation, the first signs of supervisory harmonization

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[42] In a world of constantly evolving financial instruments, the design of prudential regulations that create incentives for market participants to use derivatives only for hedging purposes remains one of the biggest challenges for regulators in conventional capital markets – and by extension to Islamic financial systems on the merits of prohibited excessive risk taking *(gharar)*. Many countries have introduced documentation standards for genuine accounting hedges based on the identification of the primary position subject, the type of instrument, the nature of risk, the risk strategy, and a measure of the effectiveness of a hedge (e.g., the hedge ratio).

emerged in 2002, when central banks and national monetary authorities of Islamic countries inaugurated the *Islamic Financial Service Board* (IFSB) in Malaysia as an international standard-setting body to ensure stability and soundness of Islamic financial services industry by developing new, or adapting existing, international finance standards consistent with Sharīʿah principles and harmonization of practices within the Islamic finance service industry.[43] Moreover, the IFSB has established a taskforce for the development of supervisory guidelines related to Sharīʿah-compliant capital market transactions, including the regulatory governance of *sukūk*.

At the same time, private sector initiatives, such as an Islamic primary market project led by Bahrain-based *International Islamic Financial Market* (IIFM) in cooperation with the *International Capital Markets Association* (ICMA), have resulted in the adoption of a memorandum of understanding on documentation standards and master agreement protocols for Islamic derivatives. Further work is also being done on issues regarding the tradability of *sukūk* and the standardization of Islamic treasury *murābaḥah* contracts. Moreover, greater importance of the *Accounting and Auditing Organization of Islamic Finance Institutions* (AAOIFI), the *General Council for Islamic Banking and Finance Institutions* (GCIBFI), and the *Islamic International Rating Agency* (IIRA) will add consistency to Sharīʿah rulings, while the retention of conventional finance market practice and the supremacy of a bankable governing law as a matter of form remain essential to maintain investor confidence in a rapidly growing structured finance market.

Also national solutions are gaining traction. While the IIFM was still working on the development of a *Master Agreement for Islamic Derivatives*, for which it had established an alliance with the *International Swaps and Derivative Association* (ISDA) in summer 2006, Malaysia's only fully-fledged Islamic banks, *Bank Islam Berhad* and *Bank Muamalat Malaysia Berhad* had already broken new ground by agreeing to execute a derivative master agreement for the documentation of Islamic derivative transactions in November 2006 (Jobst, 2007c). This standardization initiative was sponsored by the *Malaysian Financial Market Association* (Persatuan Kewangan Malaysia) with the participation from both Islamic and conventional Malaysian banks in a bid to create more liquidity and enhance transparency with a view to elevate Malaysia's aspirations of becoming a center of Islamic finance as the largest *sukūk* market in the world, while more

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[43] On March 15, 2005, the IFSB issued exposure drafts of prudential standards on risk management and capital adequacy for the Islamic financial service industry, and preparations are underway to issue an exposure draft of standards on corporate governance by the end of 2005. In April 2005 the IFSB also started preparing standards on the supervisory review process as well as transparency and market discipline.

specific regional initiatives provide a valuable platform for drawing further attention to derivatives as an important element of local capital market development. Nonetheless, derivatives remain complex and frequently opaque instruments that might be used by market players to take on excessive risk, avoid prudential safeguards, and manipulate accounting rules. While the problem of misuse is perceived to be more acute where prudential regulation, transparency, and risk management practices are not fully developed, religious qualifications add an additional layer of contingency risk to be considered by policy makers and regulators in Islamic countries as derivative products receive greater acceptance.

As Islamic finance comes into its own and companies turn to means of hedging their exposures more efficiently, financial institutions in Bahrain, Kuwait and Malaysia have been gearing up for more Sharīʿah-compliant financial instruments and structured finance – both on the asset and liability side. Financial innovation will contribute to further development and refinement of Sharīʿah-compliant derivative contracts. For instance, the development of Islamic derivatives bodes well for the Islamic insurance *(takaful)* industry,[44] whose Sharīʿah compliance has traditionally resulted in overdependence on equity and real-estate investment, restricting the potential of risk diversification from a wider spectrum of available assets.

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[44] The concept of *takaful* is similar to mutual insurance. Customers pay a certain amount of finances into a collective pool of funds and withdraw money when a claim is made. Administrators of *takaful* insurance charge a sharīʿah-compliant fee in the form of a "donation" and distribute any funds left over at the end of the year among the original contributors.

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