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BINARY OPTIONS: WHEN INVESTMENT BECOMES GAMBLING

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INTRODUCTION TO DERIVATIVES

A derivative is a financial instrument whose value is derived from an underlying asset or group of assets. They are a contract between two or more parties. The value of this contract depends on changes in the value of the asset that the derivative's value is derived from. Derivatives can also be thought of as bets on a change in price, or as insurance. Examples of underlying assets are stocks, bonds, and commodities[1]. These derivatives are linked to a specific financial instrument or indicator or commodity, and through which specific financial risks can be traded in financial markets in their own right. Transactions in derivatives should be treated as separate transactions rather than as integral parts of the value of underlying transactions to which they may be linked. Unlike debt instruments, no principal amount is advanced to be repaid and no investment income accrues. Derivatives are used for a number of purposes such as risk management, hedging, arbitrage between markets, and speculation.

Derivatives enable parties to trade specific financial risks - such as interest rate risk, currency, equity, commodity price risk, and credit risk - to other entities who are more willing, or better suited, to take or manage these risks, typically, but not always, without trading in a primary asset or commodity. The risk embodied in a derivative contract can be traded either by trading the contract itself, such as with options, or by creating a new contract which embodies risk characteristics that match, in a countervailing manner, those of the existing contract owned.

Derivatives contracts are usually settled by net payments of cash, often before maturity for exchange traded contracts such as commodity futures. Cash settlement is a logical consequence of the use of derivatives to trade risk independently of ownership of an underlying item. However, some derivative contracts, particularly involving foreign currency, are associated with transactions in the underlying item.

The value of the derivative derives from the price of the underlying item: the reference price. Because the future reference price is not known with certainty, the value of the financial derivative at maturity can only be anticipated or estimated. The reference price may relate to a commodity, a financial instrument, an interest rate, an exchange rate, another derivative, a spread between two prices, an index or basket of prices. An observable market price or index for the underlying item is essential for calculating the value of any financial derivative. If there is no observable prevailing market price for the underlying item, it cannot be regarded as a financial asset[2].

Derivative products initially emerged as hedging devices against fluctuations in commodity prices, and commodity-linked derivatives remained the sole form of such products for almost three hundred years. Derivatives came into spotlight in the post-1970 period due to growing instability in the financial markets. However, since their emergence, these products have become very popular and by 1990s, they accounted for about two-thirds of total transactions in derivative products. In recent years, the market for financial derivatives has grown tremendously in terms of their variety, complexity and turnover. In the class of equity derivatives, futures and options on stock indices have gained more popularity than on individual stocks, especially among institutional investors, who are major users of index-linked derivatives. Even small investors find these useful due to high correlation of the popular indexes with various portfolios and ease of use. The lower costs associated with index derivatives vis–a–vis derivative products based on individual securities is another reason for their growing use[3].

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1 Stefanie Strack, 'AN INTRODUCTION TO DERIVATIVE MARKETS', n.d., Available online

2 'What Are Derivatives ?', accessed 2 October 2018, https://www.managementstudyguide.com/what-are-derivatives.htm. IMF (1998), Financial Derivatives, Eleventh Meeting of the IMF Committee on Balance of Payments Statistics, Available from: https://www.imf.org/external/bopage/pdf/98-1-20.pdf

3 7-46.Pdf', accessed 2 October 2018, http://nikhil-barjatya.tripod.com/ncfm/derivative/7-46.pdf

Recently, the dangers and risks embedded in derivatives have come to the forefront. A major reason for this is because of counter-party risk. Most derivatives are based on the person or institution on the other side of the trade being able to live up to the deal that was struck. If society allows people to use borrowed money to enter into all sorts of complex derivative arrangements, we could find ourselves in a scenario where everybody carries these derivative positions on their books at large values only to find that, when it's all unravelled, there's very little money to circulate because a single failure or two along the way wipes everybody out with it. The problem becomes exacerbated because many privately written derivative contracts have built-in collateral calls that require a counterparty to put up more cash or collateral at the very time they are likely to need all the money they can get, accelerating the risk of bankruptcy[4].

The following three broad categories of participants - hedgers, speculators, and arbitrageurs trade in the derivatives market. Hedgers face risk associated with the price of an asset. They use futures or options markets to reduce or eliminate this risk. Speculators wish to bet on future movements in the price of an asset. Futures and options contracts can give them an extra leverage; that is, they can increase both the potential gains and potential losses in a speculative venture. Arbitrageurs are in business to take advantage of a discrepancy between prices in two different markets. If, for example, they see the futures price of an asset getting out of line with the cash price, they will take offsetting positions in the two markets to lock in a profit.

4 Joshua Kennon, 'What Is a Derivative and How Do Derivatives Work?', The Balance, accessed 2 October 2018, https://www.thebalance.com/what-is-a-derivative-and-how-do-derivatives-work-358098

FEATURES OF A DERIVATIVES CONTRACT

Contract:

A derivative contract specifies that some future commodity may be exchanged at a later date at a price fixed today. Notice the fact that the agreement would basically be worthless if not for the time difference between the setting of the price and the actual execution of the trade. Since the price is set today, let's say at $100 and the transaction takes place a month from now when the price could be any amount greater or lower than $100, the derivative contract becomes valuable. The derivative contract becomes a license to purchase commodities at below market prices and book an immediate gain. Therefore, the value of the contract is derived from the fluctuation in the price of an underlying asset and hence the term derivatives to define these securities.

Time Restriction:

Since derivatives are contracts, they have an expiration date. This means that after a certain date they become completely worthless. Hence, they must be utilized within a given time period or else they do not hold any value. This is opposed to the general notion of financial assets. Financial assets like stocks and bonds usually hold value for a much larger period of time. Derivatives on the other hand hold value for an extremely short period of time and this is their defining feature.

Settlement

Theoretically speaking, derivative contracts can be settled in both cash as well as in kind. This means that the person executing the contract has the right to ask for delivery of the underlying commodity or the amount of money which is equivalent to the underlying commodity. However, in reality derivative contracts are usually always settled in cash. Asking for delivery of the underlying commodity is an unheard-of occurrence in the modern world.

High Leverage:

The derivatives contracts are characterized by extremely large leverage ratios. Leverage ratios of 25 to 1 and 33 to 1 are common while trading derivatives. This is not a defining feature of derivatives meaning that a contract cannot be called a derivative contract just because it is highly leveraged. However, this is the norm with most derivative transactions.

Zero-Sum Game:

Derivative contracts are a zero-sum game. This means that the parties in a derivative contract are directly betting against each other. If one party wins, the other party by definition has to lose. This is opposed to the stock market when a rising stock price can be beneficial for everyone who is holding that stock. The fact that derivatives carry a high leverage and are a zero-sum game meaning that one of the parties involved has to lose makes it an extremely dangerous financial instrument[5].

5 'What Are Derivatives ?', accessed 2 October 2018, https://www.managementstudyguide.com/what-are-derivatives.htm

WHAT ARE BINARY OPTIONS?

Binary options are a type of derivatives contract. The UK regulators Financial Conduct Authority (FCA) have described binary options as "a form of fixed-odds betting. Typically, a trade involves predicting whether an event will happen or not (for example, will the price of a particular share or asset go up) and the outcome is either yes or no. If the investor is correct, they 'win' and should see a return on their investment; if they're wrong, they lose their full investment". In trading binary options, a speculator is predicting whether an asset class will be above or below a certain price at a certain time.

Binary options can go by many other names. On forex or interest rate markets, they are called digital options. On the American Stock Exchange they are called fixed-return options (FROs) or all-or-nothing options. They are commonly called 'binary' because they offer returns in only two outcomes: something (for example, a pre-set amount of $100) or nothing. Binary options allow you to make bets on financial products (including shares and foreign exchange), markets or economic events. Binary options are also called "yes or no" investments.
If an investor thinks an asset will be above a set price, they are predicting "yes" and buying the binary option. If they think an asset class will fall below a set price, they are predicting "no" and selling the binary option. For example, a speculator could bet on whether the share price of a company will be trading above its current price in one hour. Contract times for binary options are usually very short, from a few minutes or hours, to a few months in the future.

Binary options generally allow investors to bet on the price movements of:

- Stock indexes, like the S&P 500, Nasdaq, Russell 2000 and FTSE 100.
- Forex (currency pairs).
- Commodities, like precious metals, crude oil, natural gas, soybeans and corn.
- Individual stocks.
- Economic events, like the federal funds rate or the jobs report.

DIFFERENCES BETWEEN TRADITIONAL VANILLA OPTIONS AND BINARY OPTIONS

Binary options share all of the same underlying factors as traditional vanilla options. When pricing binary options, the same inputs are used to determine its value. The only way in which they differ is their pay-out structure on expiry. On expiry of a binary option, the pay-out of the option is only one of two outcomes. That is either 0 or 1 (100). This is why it is sometimes termed "binary" or "digital."[6]

6 Binary Trading Club (n.d.), Binary Options vs Options, Available from: http://binarytradingclub.com/binary-options-vs-options/

DIFFERENT TYPES OF BINARY OPTIONS

There are a number of binary options. The most common types are as follows[7]:

1. One Touch

This type of option pays out an investor's profit once the price of the underlying asset reaches a predetermined barrier, also known as a "trigger". Once the trigger level has been reached, the trader will receive his payout. This type of option is preferred when an investor is sure that the asset's price will perform a strong move in a certain direction and will hit the trigger value, disregarding whether the price jump is sustainable, or whether the market will retrace.

Unlike the standard binary option where you only have to predict whether the price will go up or down, here both the direction of movement and the trigger level are predetermined (some brokers allow traders to set these levels). The investor only has to decide whether the conditions will come into fulfilment. Although for the option to be "in-the-money" it will have to touch the trigger level only once, the one-touch option is generally riskier than standard binary options and therefore offers a higher payout. One-touch options will pay out more money, if the trigger is further away from the spot price. For example, if gold currently trades at $1 300 per troy ounce, a one-touch option with trigger at $1 350 will offer a higher return than one with a trigger at $1 325.

2. No Touch

The no-touch option works in the opposite fashion to one-touch options. The investor wages that the underlying asset will not reach a certain price level. Just like the one-touch option, the investor, or broker, select a certain price level above or below the spot (current) price and bet that the price will not reach the determined level within the expiration period. If it does hit it, even once, the option will instantly become "out-of-the-money", and vice versa.

As for the return, due to the higher risk they carry, these options can also yield a return of up to 500%, depending on the distance to the trigger value. Both touch and no-touch options offer a higher payout, if the conditions are harder to fulfil. No-touch binary options offer higher return the closer the trigger is. Thus, a trigger of $1 325 will pay out more money than a trigger of $1 350, because the chance of hitting the closer target is higher (the risk for the option to become "out-of-the-money" is greater).

3. Double One Touch

Double one-touch options follow the same logic as one-touch options. However, here we have two triggers, one of each side of the spot price. An option will become "in-the-money" if the price of the underlying asset breaks through one of the triggers, no matter which one.
For example, if gold currently trades at $1 300, and the trader, or broker, have set the upper trigger at $1 350 and the lower trigger at $1 250, the option will be profitable if gold either rises to $1 350, or falls to $1 250. Conversely, if the price fails to touch any of the two triggers through the expiry time, it will become "out-of-the-money". Thus, double no-touch options are suitable for conditions of market consolidation when the trader is sure that the price will accelerate and break out soon, but doesn't know in exactly which direction.

7 Binary Tribune, Other Types of Binary Options, Available from: http://www.binarytribune.com/binary-options-academy/types-of-binary-options

4. Double No Touch

Double no-touch options follow exactly the opposite principle compared to the double-touch options. There are two triggers here as well, but for the option to be “in-the-money” the underlying asset’s price shouldn’t reach either of them during the expiration period. In case one of them is hit, the option becomes “out-of-the-money” and the trader loses their investment. Thus, traders generally prefer to invest in such an instrument when they expect that the market will consolidate in a tight trading range, which often comes after a buy or sell climax (a strong price spike).

5. Paired options

Paired options are another, more exotic type of binary options. They are offered only by some brokers and are based on the performance of one asset relative to another. Here the trader chooses a pair of assets from a list and bets which asset will outperform the other during the selected period. Assets are paired according to their class and sector (these categories must match).

KEY TERMS IN BINARY OPTION

The following terms are commonly used in binary option trades:

Moneyness: One of the most salient relationships to thoroughly understand is where the binary strike price is in relationship to the underlying market. This feature is known in the field of option trading as moneyness. Understanding moneyness of the binary option contract generates the ability to gauge market sentiment and, along with it, the expected probability of success of a particular binary option.

There are three key metrics to evaluate:

1. At-the-Money (ATM): When the strike price is equal to the underlying market price (the spot).

2. In-the-Money (ITM): When the underlying market is greater than strike price. This occurs when a trader is buying the position. When the trader is opening a position to sell, the option is in-the-money when the underlying market is less than the strike price.

3. Out-of-the-Money (OTM): This occurs when a trader is opening the position to buy and when the underlying market is less than the strike price and the strike price is above the spot market price. Also when a trader is opening a position to sell and the underlying market is greater than the strike price[8].

Expiration Date: The time that the option expires.

Settlement Value: The value of the option on expiration.

Underlying Market Price: This is the actual real-time market price of the underlying contract.

Contract: This is the basic unit of a trade of one lot.

Bid: The premium price that a trader pays for opening to sell a contract, or closing a buy order.

Sell: This refers to betting the underlying market will go down. A trader puts on an open sell order. It is also the premium price that a trade pays for closing a position that was bought.

Ask: The premium price that a trader pays for an opening to buy a position. This is equivalent to putting on a position anticipating an increase in the price of the underlying market. It is also the price paid by a trader who has an open position to sell and wants to close it out.

Spread: The difference between the bid and ask. With any new market, the spread will tend to be narrow as more volume increases. In the case of binary option spreads, the spread has to be interpreted in terms of the total return.

Bid Size/Offer Size: This is the number of positions being bought or sold.

Commission Fee: The trader will pay a commission fee per transaction[9].

8 Cofnas, A. (2012), Trading Binary Options, New Jersey: Bloomberg Press

9 Ibid

EXAMPLE OF A BINARY OPTION

A binary option trade involves three steps[10]:

1. Deciding on an asset or market to trade.
2. Deciding on an expiry date or time for the option to close.
3. Deciding to buy or sell the binary option, based on the strike price and expiration date. The strike price is essentially a line in the sand. If an investor thinks the asset will be above the strike price when the contract expires, they will buy the binary option. If the investor thinks the asset will be below the strike price, they will sell the binary option.

For example, an investor wants to trade on the S&P 500, and chooses a contract with a strike price that's slightly higher than where the market is right now. That strike price is 2,075, and the expiration is 3 p.m. The objective in such a trade is to guess speculate whether an asset will be above or below the strike price at a certain time. The investor in this example will be speculating whether the S&P 500 will be above 2,075 at 3 p.m.? If he thinks it will be above the strike price, he will buy the option. If he thinks it will be below the strike price, he will sell the option. With binary options, the bid is used when you're selling a contract, and the offer is used when you're buying a contract. The bid and offer prices are always under $100. Let's say that in our hypothetical trade, the bid on the S&P 500 contract is $35 and the offer is $40. If the investor buys the binary option, he will pay the $40 offer price.
If he sells the binary option, he'll sell at the $35 bid price.

If he thinks the S&P 500 will be above 2,075 at 3 p.m., he will buy the binary option contract for $40. That's the most he can lose in the trade:

- If the investor bets correctly, the binary option settles for $100. The profit is $60, since he put the offer price of $40 down (which he will also get back). This will be termed "in the money".
- If the investor is wrong, and the S&P 500 is lower than 2,075 at 3 p.m., the trade settles for $0. He will not win anything, and he has lost the $40 he put down. The investor will be "out of the money."

If instead the investor thought that the S&P 500 will be below 2,075 at 3 p.m., he would sell the binary option:

- If he is correct, the profit is the bid, or the price at which he sold the option, which was $35.
- If he is wrong, and the S&P 500 goes higher instead, he will lose $65 ($100 less the $35 bid).

10 O'Shea, A. (2016), Introduction to Binary Options Trading Nerdwallet, retrieved from: https://www.nerdwallet.com/blog/investing/binary-options-trading/

SHARIAH ANALYSIS OF BINARY OPTION

Binary options violate a number of prohibitions in Islamic finance. Binary options are *Riba*-based trades. An investor can unjustly earn more than the money staked. *Riba* is not just limited to unjustified increment above the principal amount; *Riba* extends to any unwarranted and unjustified payments too. The classical jurists term such profiteering and premiums as *Ribh maa lam Yudhman* (profit for which no risk was borne). The pay-outs received in binary options fall under unjustified payments.

Unjustified and irregular contractual terms *(Shart Fasid)* also fall under the purview of *Riba*. The classical jurists term irregular contractual terms as *Riba Ma'nawi* (conceptual). Binary options incorporate non-Shariah compliant terms in the trade and are non-Shariah compliant from this perspective too.

Another prohibitive feature in binary options is the existence of *Gharar* (major uncertainty). The pay-out and outcome of trades in binary options are uncertain and unknown to the trading parties. *Gharar* is prohibited due to the harms it brings to the trading parties and the discord it plants between the hearts of people. Trades and transactions with *Gharar* disunite the hearts and create animosity among people[11].

Binary options are also plagued with a key prohibition in Islamic finance of *Maysir* and *Qimar*. These refer to betting and wagering. Al-Jurjani has defined *Qimar* as a game where one party gains at the expense of the other. It is an activity or competition where the gain of one party correlates to the loss of the other; one party can only gain if the other loses.

Mufti Muhammad Taqi Uthmani states that *Qimar* consists of two factors:
1) payment is certain from one side, but uncertain from the opposite side; and 2) there are only two outcomes of this activity, either the payment made may be lost or may fetch more money. This activity is underpinned by uncertainty as both parties are unaware of the outcome and what they will receive. Secondly, one party wins at the expense of the other. Thus, *Qimar* activities have two common features: First, a game of chance where the outcome is dependent on a random or uncertain factor. Second, a zero-sum game where one party wins at the expense of the other[12]. *Maysir* and *Qimar* have been explicitly prohibited in the Qur'an:

> "They question thee about strong drink (*khamar*) and games of chance (*maisir*). Say: In both is greaty sin, and (some) utility for men; but the sin in them is greater than their usefulness"
> (Qur'an 2:219)

11 Jakhura, S. (2006), What makes conventional insurance impermissible and Takaful permissible?, CIEFSA, Available from:

12 Habib, F. (2017). The Issue of Speculation in the Islamic Capital Market in Journal of Islamic Economics, Banking and Finance 13 (2) pp 89-101

A binary option trade typically involves predicting whether an event will happen or not (for example, will the price of a particular share or asset go up) and the outcome is either yes or no. If the investor is correct, they 'win' and should see a return on their investment; if they're wrong, they lose their full investment. This is clearly a form of *Qimar* as described above.

Dr Mohammed Obaidullah asserts that in options the buyer and seller have diametrically opposite expectations. Depending on the actual outcome, one of them will win at the expense of the other. The gains are therefore in the nature of *Maysir*, and *Maysir* cannot occur without the existence of *Gharar*, being a subset of that larger category. Dr Obaidullah explains that speculating on where random fluctuations will move the price of an underlying asset or commodity in the future infers that the parties' gains and losses also will be random, demonstrating that dealing in option contracts is nothing more than a game of chance. Gains are therefore in the nature of *Maysir*, while the possibility of suffering default after incurring massive losses indicates *Gharar*. Dr Obaidullah concludes his discussion on options by stating that these can be used for speculating on price movements and generate unearned income, which violates Islamic norms of financial ethics[13].

Options being derivatives, are zero-sum games and a form of gambling. Dr Sami Al-Suwailem explains that, in a zero-sum game, one party gains at another's expense, i.e., it is a "transfer of wealth for no counter-value"; this he opines is "condemned in the Qur'an". He explains that the direct conflict of interest inherent in a zero-sum game may create hatred between the two parties, which is one reason the Qur'an prohibits *Maysir*:

> "Satan only wants to plant enmity and hatred among you through wine and *Maysir*"
> (Q6:91)

The harms of binary options trading have been recognised by regulatory bodies too. In July 2018, the European Security and Markets Authority (ESMA) banned binary options trading. In ESMA's words, there is "a structural expected negative return and inbuilt and unmanageable conflicts of interest" between providers and their clients. Put more simply, binary by name does not equal binary by nature. If the market moves against them, punters lose their entire stake. But if the market goes their way, they might only be able to take home 50 per cent, for example. On top of the skewed odds, many binary providers act as a direct counterparty to their client's trades — typically in more opaque over-the-counter markets where it is hard for punters to independently verify market movements. So the incentive is there to tweak the price of the underlying instrument when the binary option expires, or extend the term by a fraction of a second to avoid having to pay out winnings to a successful customer[14].

13 Iqbal et al. (2012), Application of Options in Islamic Finance, ISRA

14 Murphy, H. (2018), Binary Options trading is dead in Financial Times. Retrived from: https://www.ft.com/content/7a792356-7f79-11e8-8e67-1e1a0846c475

Can there be Sharia compliant Binary Options?

Binary options do not serve any economic purpose to the traders besides speculative gain. Hence, there is no alternative contract developed by practitioners in the Islamic finance industry. Investors and traders have a variety of Shariah compliant products available in the markets to invest and make profit according to their risk-return-maturity needs and appetites.

Conclusion

Binary options are a type of derivative. Binary options have been described by regulators as fixed-odds betting. They are known by other names such as 'digital options', 'fixed-return options', 'all-or-nothing options'. They are termed as binary because they offer only two outcomes: a win or loss for the trader. Binary options are not Shariah compliant as they incorporate *Riba*. The trader can receive more than the amount staked without a justified reason. Alternatively, he can lose and the broker can gain the funds without justification. Binary options also incorporate *Gharar* as the outcome is unknown to the betting parties. The outcome is pegged on an uncertain event. As a result, binary options are zero-sum games which incorporate *Qimar*; one party wins at the expense of the other in binary options. Binary options do not serve any economic benefit or risk management objective. They mainly serve speculators. Islamic investors should not invest in binary options instead can choose from a wide array of Shariah compliant products and investments to earn a lawful income.

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Disclaimer

This is a preliminary Shariah research and is by no means a definitive conclusion or fatwa on the aforementioned subject. This paper was written to develop knowledge and research on this complex subject from a Shariah perspective. We hope that this paper will prompt and engage global Islamic finance bodies, Shariah scholars and Muslim economists to analyze, comment and build upon the arguments expressed.