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# MANAGING EQUITY RISK BY THE USE OF OPTIONS IN SAUDI STOCK MARKET

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## ABSTRACT

Risk management is a crucial segment of any effective method of trading on the stock market. The main objective of risk management is to ensure that capital is used wisely, and profit is made, thus mitigating any losses. There are many financial instruments used to manage the risk, options are one of them. Over the last years, Saudi stock market has been more volatile. This extreme volatility makes it hard to invest for the future. This work has studied the impact of introducing of options in Saudi stock market. To see how investors and financial institution in Saudi Arabia can hedge their equity risk, Black-Scholes model was used to calculate the option price, call and put. Five listed stocks from Tadawul All Share Index (TASI) were selected, each from different sectors. The results have shown that four out of the five selected stocks show that the application of put option is more relevant in hedging the risk, while the fifth stock shows that the application of call option is more relevant.

## INTRODUCTION

Risk management is a crucial part of any effective method of trading on the market [1]. It is a key factor in becoming and continuing to be a successful trader, regardless of which market an investor is trading in and how much money the trader spends. Occasionally, trading losses will inevitably occur, and risk management and minimization are important. The probability of losing is part of any kind of investment. There is no trade policy that can help the investor win all the time [2].

In this way, investors should accept and learn about the loss in order to close a successful exchange. The main objective of risk management is to ensure that capital is used wisely and that profits are made, thereby alleviating any losses

[3]. There are a number of financial instruments used to manage risk, and options are one of them. Options are part of the larger security group known as derivatives. The value of a derivative depends on or derives from the price of something else. Options are financial instruments between derivatives that derive value from underlying assets, such as inventories [4]. An option contract gives the purchaser the right to purchase or sell the underlying asset, depending on the type of contract they have. The holder is not obliged to buy or sell the asset if he decides not to do so [4].

There are two main types of options, a call option and a put option [5]. Call option gives the holder the right, but not the obligation, to purchase the asset at the stated price (known as the exercise price) within a specified timeframe [5]. By buying a call option, an investor can protect his position from an increase in market prices. Put option gives the holder the right, but not the obligation, to sell the asset at the specified price within a specified timeframe. An investor can protect his underlying equity holding from unfavourable price movements by buying a given option. In the case of options, the purchaser shall pay an option premium for the right granted by the contract [6].

There is a relationship between standard measures for firm innovation and the market for equity options. A company generates more patents with more options trading [7]. Active options markets also affect the company's innovation strategy, while a more open-ended company pursues a more diverse, creative and risky innovation strategy. As options used by specialist traders, it can also be of interest to the individual investo [8] r. There are also benefits that an investor can have. It will offer an improvement in cost-efficiency by providing a strong leverage capacity, meaning investors will take an alternative position close to the stock position, but save massive costs [8]. Another drawback of the fact that it could be less risky than equities is that there are circumstances in which holding an option becomes riskier than purchasing equities. In the other side, there are also circumstances in which options may be used to hedge the chance. Options also have the advantage of having the ability to generate better percentage gains and offer a range of strategic investment alternatives [9].

Efficient use of options can also boost the risk profile of equity funds in terms of risk indicators such as value-at-risk. In contrast with the acquisition and sale of shares directly, dealing of options allows portfolio managers to change the exposure of the portfolio to the capital exchange at a lower cost and faster pace [9]. Furthermore, option market is likely to draw knowledgeable investors who can trade in options if they have superior knowledge. Thus, mutual funds that use options could tell customers that they can make greater use of and use their knowledge by making market-specific exposures at a fraction of the cost of purchasing stock shares directly [10]. Furthermore, the successful use of options requires a high degree of understanding of the options market and pricing strategies. Such expertise and capabilities, which go beyond the standard skills of mutual fund manager, might help to achieve a higher degree of maturity among other funds that trade in options [11]. In addition, option data tends to minimise the severity of the tragedy, as option rates now represent the selling of events by the consumer regardless of their

occurrence [12]. Options are also becoming more attractive as volatility increases, provided that investors may use options either to minimise their exposure to volatility or to leverage the degree of fluctuations in volatility through the use of the options portfolio [13].

Over the last years, Saudi stock market has been more volatile [14]. This extreme volatility makes it hard to invest for the future. This research paper has studied the impact of introducing of options in Saudi stock market. Five-listed Saudi stocks were selected to see how investors and financial institution in Saudi Arabia could hedge their equity risk. Black-Scholes model was used to calculate the option prices, call and put.

## METHODOLOGY

For this work, the methodology approach that was used is quantitative approach. This methodology calculated the option price, call and put, and see how an investors and financial institution in Saudi Arabia can hedge the equity risk. Black-Scholes Model was used to calculate the price [15]. Five listed stocks from TASI were selected, each from different sectors. A daily close price for one year, a year of 2019 was collected. a three different option periods were created:1. Three-Month Option period: May 2019-August 2019. 2. Three-Month Option period: August 2019-November 2019. 3. Six-Month Option period: May 2019-November 2019.The selected stocks are ALINMA stock, ALARKAN stock, KAYAN stock, SAAC stock, and TADCO stock.

## RESULT AND DISCUSSION

### *Alinma Stock*

For a period of three months (1/5/2019-1/8/2019), and at an exercise price of SAR 27.15, call and put option have a price close to each other, call= SAR 0.962 and put= SAR 0.960, this is justified by the fact that the spot price was so close to the exercise price (forward price).

At the beginning of the contract 1/5/2019: Call option price = SAR 0.962 and since the current market price SAR 24.8 is lower than the exercise price SAR 27.15, the call option contract is out-of-the-money. Hence, long will not going to exercise the contract. There will be no Payoff for the long and short since the contract will not exercise. Long have to pay the premium = SAR 0.962 (option price) to the short as they agreed at the beginning, and long will lose SAR 0.962

On the other hand, entering into a put option contract as a long will be a good idea. as shown in the table above, the price of put option = SAR 0.960, and since the current market price SAR 24.8 is lower than the exercise price SAR 27.15, the put option contract is in-the-money, and it will be exercised by the long. Since the contract will be exercised, short is going to pay an amount equal to SAR 2.35 to the long. Long will have to pay the premium to the short, therefore, the net profit that long is going to achieve is SAR 1.39.

For a period of the next three months 1/8-1/11, and at an exercise price of SAR 24.95, call and put option have also a price close to each other. At the beginning of call contract 1/8/2019: call price SAR 1.078, the current market

price SAR 20.84 is lower than the exercise price SAR 24.95, the call option is Out-of-the-Money. Long will not going to exercise the contract, hence, there will be no payoff. Long's loss SAR 1.08, this is the call price that must be paid by the long to the short.

The put price SAR 1.076, and the put option is considered to be in the-money since the current market price SAR 20.84 is lower than the exercise price SAR 24.95. Put contract is going to be exercised by the long, and short is going to pay SAR 4.11 to the long. The net profit that long is going to achieve is SAR 3.03

For a period of six months 1/5/2019-1/1/2019 and at an exercise price of SAR 27.30, call price SAR 1.277, and put price SAR 1.273. In addition, call option is considered to be out-of-the-money, and long's loss SAR 1.28. On the other hand, put option is considered to be In-the- Money, Long will be going to exercise the contract with earning a profit SAR 5.19. By comparing between the two three-month options contract and the six-month option contract, in all of them, the put option was in-the-money, but as the time to expiration increases the value of the option increases. The profit of the long in the six-month put option is SAR 5.19, which is much bigger than the profit in both three-month put option SAR 0.95 and SAR 3.03. Based on Figure 1, an increase of 5% of X will decrease the call price in both periods: three-month call and six-month call. Oppositely, an increase of 5% of X will increase the put price in both periods. On the other hand, a decrease of X by 5% will increase the call price in in both periods, and will decrease the put price also in both periods

| | Three-month option 1/8/2019-1/11/2019 | | | | Six-month option 1/5/2019-1/11/2019 | | | |
|---|---|---|---|---|---|---|---|---|
| | Increase of X by 5% | | Decrease of X by 5% | | Increase of X by 5% | | Derease of X by 5% | |
| | Call | Put | Call | Put | Call | Put | Call | Put |
| S0 | 24.8 | 24.8 | 24.8 | 24.8 | 27 | 27 | 27 | 27 |
| X | 26.19 | 26.19 | 23.7 | 23.7 | 28.67 | 28.67 | 25.94 | 25.94 |
| Price | SAR 0.549 | SAR 1.784 | SAR 1.71 | SAR 0.47 | SAR 0.72 | SAR 2.07 | SAR 2.00 | SAR 0.65 |
| Payoff for the Long | SAR - | SAR 5.35 | SAR - | SAR 2.86 | SAR - | SAR 7.83 | SAR - | SAR 5.10 |
| Profit for the Long | SAR (0.55) | SAR 3.57 | SAR (1.71) | SAR 2.39 | SAR (0.72) | SAR 5.76 | SAR (2.00) | SAR 4.45 |

**Figure 1.** ALINMA Stock Comparison For 3 Months Option And 6 Months Option.

### *Alarkan Stock*

For a period of three months (1/5/2019-1/8/2019), and at an exercise price of SAR 11.08, call and put option have a price close to each other, call SAR 0.366 and put SAR 0.366. At the beginning of the contract 1/5/2019, since the current market price SAR 11.26 is higher than the exercise price SAR 11.08, the call option contract is in-the-money. Short must pay long SAR 0.18, and since the call price is greater than what long will receive, long is not making a profit. The breakeven price is when the difference between the payoff and the

call price is zero. Hence, to achieve profit, payoff has to be more than the call price

On the other hand, since the current market price SAR 11.26 is greater than the exercise price SAR 11.08, put option is considered to be out-of-the-money. long will not going to exercise the contract and he must pay the premium SAR 0.365 to the short.

At the beginning of the contract 1/8/2019, the current market price is SAR 12. Since the market price is greater than the exercise price SAR 11.33, call option is in-the-money. Short must pay long SAR 0.67, and since the call price is greater than what long will receive, long is not making a profit. The breakeven price is when the difference between the payoff and the call price is zero. Hence, to achieve profit, payoff has to be more than the call price.

At the beginning of the contract 1/8/2019, it appears that the current market price SAR 12 is greater than the exercise price SAR 11.33, as a result, put option is out-of-the-money. Long will not going to exercise the contract, and he must pay SAR 0.83 to the short

For the six-month period, for the call option, at the beginning of the contract 1/5/2019, since the current market price SAR 12 is higher than the exercise price SAR 11.14, the call option is in-the-money. As the time to expiration increases the value of the option increases, and by comparing the six-month option with the previous two three-month option, it appears that the value of call option has increased. Long will going to exercise the contract, and he must pay SAR 0.86 to the short, with earning SAR 0.28.

In addition, for the six-month period, for the put option, at the beginning of the contract 1/5/2019, put option is out-of-the-money as the current market price SAR 12 exceed the exercise price SAR 11.14. Long will not going to exercise the contract, and SAR 0.59 must be paid by the long to the short. Based on Figure 2, an increase of 5% of X will decrease the call price in both periods: three-month call and six-month call. Oppositely, an increase of 5% of X will increase the put price in both periods. On the other hand, a decrease of X by 5% will increase the call price in in both periods, and will decrease the put price also in both periods.

| | Three-month option 1/8/2019-1/11/2019 | | | | Six-month option 1/5/2019-1/11/2019 | | | |
|---|---|---|---|---|---|---|---|---|
| | Increase of X by 5% | | Decrease of X by 5% | | Increase of X by 5% | | Derease of X by 5% | |
| | Call | Put | Call | Put | Call | Put | Call | Put |
| S0 | 11.26 | 11.26 | 11.26 | 11.26 | 11.02 | 11.02 | 11.02 | 11.02 |
| X | 11.89 | 11.89 | 10.76 | 10.76 | 11.7 | 11.7 | 10.59 | 10.59 |
| Price | SAR 0.600 | SAR 1.160 | SAR 1.10 | SAR 0.53 | SAR 0.35 | SAR 0.90 | SAR 0.87 | SAR 0.32 |
| Payoff for the Long | SAR 0.11 | SAR - | SAR 1.24 | SAR - | SAR 0.30 | SAR - | SAR 1.41 | SAR - |
| Profit for the Long | SAR (0.49) | SAR (1.16) | SAR 0.14 | SAR (0.53) | SAR (0.05) | SAR (0.90) | SAR 0.54 | SAR (0.32) |

**Figure 2.** ALARKAN Stock Comparison For 3 Months Option And 6 Months Option

***Kayan Stock***

At an exercise price of SAR 13.19, Call and put option have a price close to each other, call SAR 0.526 SAR and put SAR 0.525. For the three months period, at the beginning of the contract 1/5/2019, it appears that the current market price SAR 11.3 is lower than the exercise price SAR 13.19, the call option contract is out-of-the-money. Hence, long will not going to exercise the contract. There will be no Payoff for the long and short since the contract will not exercise. Long have to pay the premium SAR 0.526 to the short. Next in terms of put option, On the other hand, entering into a put option contract as a long will be a good idea. Since the current market price SAR 11.3 is lower than the exercise price SAR 13.19, the put option contract is in-the-money, and it will be exercised by the long. Short is going to pay an amount equal to SAR 1.89 to the long. Long will have to pay the premium to the short, therefore, the net profit that long is going to achieve is SAR 1.37.

As for the second three months period, for the call option, At the beginning of call contract 1/8/2019, call price SAR 0.601, the current market price SAR 10.16 is lower than the exercise price SAR 11.37, the call option is out-of-the-money. Long will not going to exercise the contract, hence, there will be no payoff. Long's loss SAR 0.60, this is the call price that must be paid by the long to the short. Next, for the put option, put price is SAR 0.60, and the put option is considered to be in-the-money since the current market price SAR 10.16 is lower than the exercise price SAR 11.37. Put contract is going to be exercised by the long, and short is going to pay SAR 1.21 to the long. The net profit that long is going to achieve is SAR 0.61.

For the six months period, at an exercise price of SAR 13.27, call price SAR 0.846, and put price SAR 0.844. call option is considered to be out-of-the-money, and long's loss SAR 0.85. On the other hand, put option is considered to be in-the-money, Long will be going to exercise the contract with earning a profit SAR 2.26. By comparing between the two period of three-month options contract and the six-month option contract, in all of them, the put option was in-the-money, but as the time to expiration increases, the value of the option increases. The profit for the long in the six-month put option period is SAR 2.26, which is much bigger than the profit in both three-month put option SAR 1.37 and SAR 0.6. Based on Figure 3, an increase of 5% of X will decrease the call price in both periods: three-month call and six-month call. Oppositely, an increase of 5% of X will increase the put price in both periods. On the other hand, a decrease of X by 5% will increase the call price in in both periods, and will decrease the put price also in both periods.

| | Three-month option 1/8/2019-1/11/2019 | | | | Six-month option 1/5/2019-1/11/2019 | | | |
|---|---|---|---|---|---|---|---|---|
| | Increase of X by 5% | | Decrease of X by 5% | | Increase of X by 5% | | Derease of X by 5% | |
| | Call | Put | Call | Put | Call | Put | Call | Put |
| S0 | 11.3 | 11.3 | 11.3 | 11.3 | 13.12 | 13.12 | 13.12 | 13.12 |
| X | 11.93 | 11.93 | 10.8 | 10.8 | 13.93 | 13.93 | 12.6 | 12.6 |
| Price | SAR 0.361 | SAR 0.921 | SAR 0.88 | SAR 0.31 | SAR 0.57 | SAR 1.23 | SAR 1.18 | SAR 0.52 |
| Payoff for the Long | SAR - | SAR 1.77 | SAR - | SAR 0.64 | SAR - | SAR 3.77 | SAR - | SAR 2.44 |
| Profit for the Long | SAR (0.36) | SAR 0.85 | SAR (0.88) | SAR 0.33 | SAR (0.57) | SAR 2.54 | SAR (1.18) | SAR 1.92 |

**Figure 3.** KAYAN Stock Comparison For 3 Months Option And 6 Months Option

***Saac Stock***

For a period of three months (1/5/2019-1/8/2019), and at an exercise price of SAR 20.38, call and put option have a price close to each other, call= SAR 1.6458 and put= SAR 1.6445. For the call option, at the beginning of the contract 1/5/2019, since the current market price SAR 19.85 is lower than the exercise price SAR 20.49, the call option contract is out-of-the-money. Hence, the contract will not be exercised, and long must pay the short SAR 1.65.

On the other hand, for the put option, since the current market price SAR 19.85 is lower than the exercise price SAR 20.49, the put option contract is in-the-money. Short must pay the long SAR 0.64, and since the put price is greater than what long will receive, long is not making a profit.

For the next 3 months period, at the beginning of call contract 1/11/2019, call price = SAR 1.294, the current market price SAR 14.06 is lower than the exercise price SAR 19.97, the call option is out-of-the-money. Long will not going to exercise the contract, hence, there will be no payoff. Long's loss SAR 1.29, this is the call price that must be paid by the long to the short.

In terms of the put option, put price SAR 1.293, and the put option is considered to be in-the money since the current market price SAR 14.06 is lower than the exercise price SAR 19.97. Put contract is going to be exercised by the long, and short is going to pay SAR 5.91 to the long. The net profit that long is going to achieve is SAR 4.61.

For the 6 months period, at an exercise price of SAR 20.61, call price SAR 2.081, and put price SAR 2.079. In addition, the call option is considered to be out-of-the-money, and long's loss SAR 2.08. On the other hand, put option is considered to be in-the-money, Long will be going to exercise the contract with earning a profit SAR 4.47. Based on Figure 4, an increase of 5% of X will decrease the call price in both periods: three-month call and six-month call. Oppositely, an increase of 5% of X will increase the put price in both periods. On the other hand, a decrease of X by 5% will increase the call price in in both periods, and will decrease the put price also in both periods.

| | Three-month option 1/8/2019-1/11/2019 | | | | Six-month option 1/5/2019-1/11/2019 | | | |
|---|---|---|---|---|---|---|---|---|
| | Increase of X by 5% | | Decrease of X by 5% | | Increase of X by 5% | | Derease of X by 5% | |
| | Call | Put | Call | Put | Call | Put | Call | Put |
| S0 | 19.85 | 19.85 | 19.85 | 19.85 | 20.38 | 20.38 | 20.38 | 20.38 |
| X | 20.96 | 20.96 | 18.97 | 18.97 | 21.64 | 21.64 | 19.58 | 19.58 |
| Price | SAR 0.876 | SAR 1.862 | SAR 1.77 | SAR 0.77 | SAR 1.67 | SAR 2.68 | SAR 2.56 | SAR 1.54 |
| Payoff for the Long | SAR - | SAR 6.90 | SAR - | SAR 4.91 | SAR - | SAR 7.58 | SAR - | SAR 5.52 |
| Profit for the Long | SAR (0.88) | SAR 5.04 | SAR (1.77) | SAR 4.14 | SAR (1.66) | SAR 4.90 | SAR (2.55) | SAR 3.98 |

**Figure 4.** SAAC Stock Comparison For 3 Months Option And 6 Months Option

***Tadco Stock***

For a period of three months (1/5/2019-1/8/2019), at an exercise price of SAR 9.57, Call and put option have a price close to each other, call SAR 0.348 and put SAR 0.347. At the beginning of the contract 1/5/2019, it appears that the current market price SAR 8.86 is lower than the exercise price SAR 9.57, the call option contract is out-of-the-money. Hence, long will not going to exercise the contract. Long have to pay the premium SAR 0.35 to the short. On the other hand, entering into a put option contract at 1/5/2019 as a long will be a good idea. Since the current market price SAR 8.86 is lower than the exercise price SAR 9.57, the put option contract is in-the-money, and it will be exercised by the long. Short is going to pay an amount equal to SAR 0.71 to the long. Long will have to pay the premium to the short, therefore, the net profit that long is going to achieve is SAR 0.37.

At the beginning of call contract 1/8/2019, call price SAR 0.287, the current market price SAR 7.09 is lower than the exercise price SAR 8.91, the call option is out-of-the-money. Long will not going to exercise the contract, hence, there will be no payoff. Long's loss SAR 0.29, this is the call price that must be paid by the long to the short. Furthermore, the put price is SAR 0.286, and the put option is considered to be in-the money since the current market price SAR 7.09 is lower than the exercise price SAR 8.91. Put contract is going to be exercised by the long, and short is going to pay SAR 1.82 to the long. The net profit that long is going to achieve is SAR 1.54.

For the six-month period, the exercise price of SAR 9.63, call price SAR 0.445, and put price SAR 0.444. Call option is considered to be out-of-the-money, and long's loss SAR 0.45. On the other hand, put option is considered to be in-the-money, Long will be going to exercise the contract with earning a profit SAR 2.09. Based on Figure 5, an increase of 5% of X will decrease the call price in both periods: three-month call and six-month call. Oppositely, an increase of 5% of X will increase the put price in both periods. On the other hand, a decrease of X by 5% will increase the call price in in both periods, and will decrease the put price also in both periods.

| | Three-month option 1/8/2019-1/11/2019 | | | | Six-month option 1/5/2019-1/11/2019 | | | |
|---|---|---|---|---|---|---|---|---|
| | Increase of X by 5% | | Decrease of X by 5% | | Increase of X by 5% | | Derease of X by 5% | |
| | Call | Put | Call | Put | Call | Put | Call | Put |
| S0 | 19.85 | 19.85 | 19.85 | 19.85 | 20.38 | 20.38 | 20.38 | 20.38 |
| X | 20.96 | 20.96 | 18.97 | 18.97 | 21.64 | 21.64 | 19.58 | 19.58 |
| Price | SAR 0.876 | SAR 1.862 | SAR 1.77 | SAR 0.77 | SAR 1.67 | SAR 2.68 | SAR 2.56 | SAR 1.54 |
| Payoff for the Long | SAR - | SAR 6.90 | SAR - | SAR 4.91 | SAR - | SAR 7.58 | SAR - | SAR 5.52 |
| Profit for the Long | SAR (0.88) | SAR 5.04 | SAR (1.77) | SAR 4.14 | SAR (1.66) | SAR 4.90 | SAR (2.55) | SAR 3.98 |

**Figure 5.** TADCO Stock Comparison For 3 Months Option And 6 Months Option

## CONCLUSION

This work has examined impact of introducing of options in Saudi stock market. Over the period of 2018-2019, Saudi market has been a bearish, and the main concern of an investor is declining in the stock price, this signify that options can be a useful tool in hedging the risk in Saudi market. The result has shown that four out of the five selected stocks: Alinma, Kayan, Amiantit, and Tabuk Agriculture stocks, the application of put option is more relevant. It appears that put option is applicable in hedging the risk at the existing market condition. While it appears that for the same mentioned four stocks, call option contract is out-of-the-money. This is justified by the fact that the exercise price was higher than the spot price, at the same time, the condition of the Saudi market says that the future is to sell at a discount, not premium. However, for the buyer, they will buy call option if it sells at a backwardation, not contango. For Alarkan stock, the result shows that the call option contract is in-the-money, while put option is out-of-the-money. The reason behind that might come back to the fact that the exercise price was lower than the current spot price, which means that Alarkan stock is being sold at a discount, as a result of the current market condition, there will be an investor who want to buy this stock

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