

Analysis Tesla in the Future by Binary Option and Four Different Sensitivity

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ABSTRACT

There is a large global market in new energy vehicles, and one of the most noticeable kinds is Tesla. Through the inclination of Tesla graph is upward, many people worry about the risk of Tesla because of its security lead to value. Since a binary option was a fast and extremely simple financial instrument, when the number hits the boundary, you will gain the profit or vice versa. Thus, this paper used binary option with the call option picture to evaluate. According to real life, this paper used data which are most correspond to real. In this way, this paper found that the graph clarify the gain and the loss at the specific number clearly in last five years. In addition, there four sensitivity analysis about call option to support the idea, respectively, spot price, time to maturity, stigma and striking price. In addition each graph shows different formulas and pictures for people to compare. In these figures, three of these have an upward direction, and rest of these has a downward direction. The result shows the tendency of Tesla and forecast the value of Tesla in the future. And this paper think that there is great potential in Tesla lead to the growth of sells.

Keywords: *New energy vehicles, Binary option, Call option, Sensitivity analysis*

1. INTRODUCTION

Tesla Motors was founded in July 2003 by Martin Eberhard and Marc Tarpenning. The company's name is a tribute to inventor and electrical engineer Nikola Tesla. In February 2004, X.com co-founder Elon Musk became the company's largest shareholder and chairman with a \$6.5 million investment. He has served as Chief Executive Officer since 2008. According to Musk, Tesla aims to help accelerate the shift to sustainable transportation and energy through electric vehicles and solar power. Tesla began production of its first model, the Roadster, in 2009. It was followed by the 2012 Tesla Model S sedan, the 2015 Tesla Model X SUV, the 2017 Tesla Model 3 sedan, and the 2020 Tesla Model Y crossover. Tesla Model 3 is the world's best-selling plug-in electric vehicle and became the first electric vehicle to sell one million units worldwide in June 2021.

Tesla's achievements are brilliant, but investment in this industry is based on the future. Therefore, many investors and consumers do not understand what tesla's future will be. There is a question in everyone's mind: Will Tesla continue to be profitable in the future? Some

people analyze Tesla stock, Wall Street analysts are wildly divided on the future growth prospects for this company, and analysts' one-year share price targets range from \$160 to \$500[1]. On August 11, 2020, at 16:59 EDT, Tesla announced a 5-for-1 stock split [2], Tesla's stock price rose 17.94% in the 2 days following the split—adding almost \$50 billion in market value. So we have a good look at Tesla. Investors and consumers are cautious and afraid of losing the money they invested, so this paper analyzes Tesla's situation and future planning from the perspective of options. To get accurate data. The fuzzy price of the binary option is obtained by using a risk-neutral pricing principle and quasi-conditional expectation [3].

How can one relate stock fluctuations and information-based human activities? We present an incomplete market model by adjoining the Black-Scholes exponential Brownian motion model for stock fluctuations with a hidden Markov process, representing the state of information in the investors' community [4]. Arbitrage methods' fundamental economic principles of option pricing are particularly clear in this setting [5].

What is the binary option? The binary option is an exotic call option with discontinuous payoffs. The option pays off a fixed, predetermined amount if the underlying asset price exceeds the strike price on its expiration date. There are two kinds of binary options: asset-or-nothing call options and cash-or-nothing call options [6]. Here we use binary options to analyze and evaluate the value of Tesla. To find Tesla's production capacity, stock trend, and sales performance. It will be easy for each individual and firm to feel Tesla's profits and losses more intuitively so that investors and consumers can decide whether to invest or buy Tesla's products and Stock. Note that the underlying asset is the stock for the binary option, and the underlying asset price is termed the stock price. Fischer Black and Myron Scholes created the Black-Scholes option pricing method, and Cox, J. C., S. Ross, and M. Rubinstein proposed the Binomial Tree option pricing method, which laid the foundation for the new securities pricing [7]. Also, there is the put option and call option. A put is an option to sell, and a call is an option to buy [8]. James D. Macbeth and Larry J. Merville mention that the call option model is the Black and Scholes model (B-S model) [9]. In Stoll's article [10], on the relationship between put and call option prices, He asserts that the forces of arbitrage (instituted by converters) will ensure an exact functional relationship between the value of a call option and the value of a put option: namely,

$$C - P = V - E / (1 + i) \quad (1)$$

where C = value of a call with exercise price E and T -periods before the expiration

P = value of a put with the same exercise price and maturity date

V = current value of the common stock

$i = i(T)$, the risk-less, T -period rate of interest.

We are searching the chart of the Tesla seasonal profit and stock on the Financial website. We compare together to conclude the statistic of the percentage and increase the rate of Tesla profit and losses or options. In abstraction, it is clear the method we use in it. We will post particular information about the company of Tesla below. Then it is the logic of calculating the profit and losses of Tesla and put the diagram which shows the

result of calculation for the investor feel the sales of Tesla products and the rise or fall of the stock more directly by using the data. And we will use the chart to show how Tesla will get benefit by call option and put option. Meanwhile. We will emerge the risk for it. Then it is the conclusion of our searching result, which provides some advice for owning stock and consumption for Tesla.

2. FIRM DESCRIPTION

Tesla, Inc. is an American electric vehicle and clean energy company based in Palo Alto, California, United States. Tesla designs and manufactures electric cars, battery energy storage from home to grid-scale, solar panels and solar roof tiles, and related products and services. In 2020, Tesla had the most sales of battery electric vehicles and plug-in electric vehicles, capturing 16% of the plug-in market (including plug-in hybrids) and 23% of the battery-electric (purely electric) market. Through its subsidiary Tesla Energy, the company develops and is a major installer of photovoltaic systems in the United States. Tesla Energy is also one of the largest global battery energy storage systems suppliers, with 3 gigawatt-hours (GWh) installed in 2020.

Founded in July 2003 by Martin Eberhard and Marc Tarpenning as Tesla Motors, the company's name is a tribute to inventor and electrical engineer Nikola Tesla. In February 2004, via a US\$6.5 million investment, X.com co-founder Elon Musk became the company's largest shareholder and its chairman. He has served as CEO since 2008. According to Musk, the purpose of Tesla is to help expedite the move to sustainable transport and energy obtained through electric vehicles and solar power. Tesla began production of its first car model, the Roadster, in 2009. This was followed by the Tesla Model S sedan in 2012, the Tesla Model X SUV in 2015, the Tesla Model 3 sedan in 2017, and the Tesla Model Y crossover in 2020. The Tesla Model 3 is the all-time best-selling plug-in electric car worldwide and, in June 2021, became the first electric car to sell 1 million units globally. Tesla's global vehicle sales were 499,550 units in 2020, a 35.8% increase over the previous year. In 2020, the company will produce over 1 million electric cars.

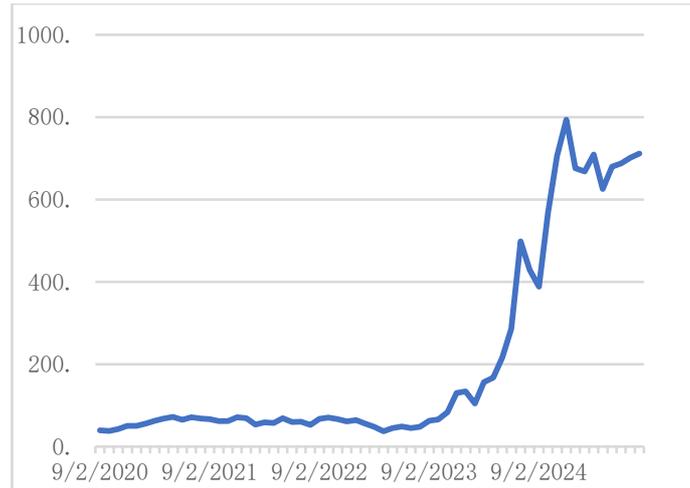


Figure 1. The stock price of Tesla from Yahoo Finance

Here is a figure showing the stock price of Tesla from Yahoo Finance. As we can see here, from 2020 to 2021, the general status of Tesla is going up. The sales of the model 3 and other electric car products are numerous. This was a great success. However, during the pandemic, the purchasing wants and needs decreasing. The Insufficient supply in the semiconductor and chip industry has also caused the recession of the company's current status. Still, due to Tesla's prosperity and popularity globally, the estimation is that Tesla will keep doing well after the pandemic totally passes. According to the 2021 Q2 report of Tesla, the company has successfully made a profit. Its market is expanding.

3. BINARY OPTION MODEL

Binary options depend on the outcome of a "yes or no" proposition, hence the name "binary." Traders receive a payout if the binary option expires in the money and incur a loss if it expires out of the money. The benefits and risks of binary options are fixed in advance, and the benefits are only determined by whether the underlying asset's price meets the predetermined conditions. If your prediction is correct, you receive the agreed payout. If not, you lose your initial stake and nothing more. Thus, the risk in finance is completely fixed.

For our binary option, assume X as the strike price. The interest rate r is 0.07%. Sigma is 0.8, the spot price is 673, And the profit setting is Y as 100\$. So, when the final price is larger than X , we get Y dollars. If not, we got 0. So, from our random simulation with the price setting of 1000\$, here's what we got.

$$\text{call option} = IF(ST > \text{strike price}, 100, 0) \quad (2)$$

$$\text{put option} = IF(ST < \text{strikeprice}, 100, 0) \quad (3)$$

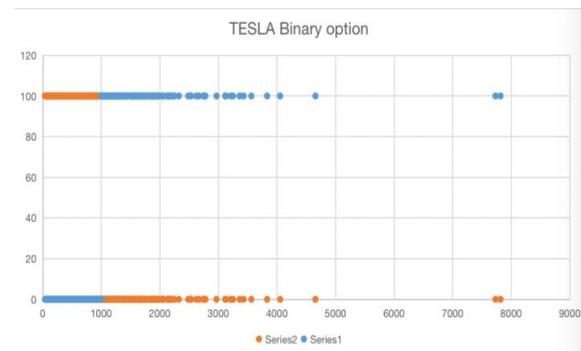


Figure 2. Binary option of Tesla

4. RESULTS ANALYSIS

We find that the call option's average price is 19.6, and put option's price is 80.4. Therefore, The pv equals 19.58628 and 80.34 for pv'spv's put option.

Here, we consider the spot price, the time to maturity, the volatility and the striking price, in establishing the binary option model to estimate the sensitivity analysis of TESLA. And we found that the first three factors show that profits increase with the increasing of variables. The striking price was different from other elements, however, which showed a downward graph. Thus, with the striking price grow larger and faster, the call option price would decrease quickly.

Besides, we should also pay attention to the other factors, such as the market demand and the supply. According to the research report in China, Tesla's sales of new energy vehicles have always ranked among the top three, which meant that most people had a favor on Tesla. It can provide Tesla with many opportunities to sell in China or other countries. In addition, with the development of technology, Tesla has more advanced technology and comfortable seating feeling. Through these elements, more young people will prefer this kind of car.

In Wall Street, it is a biggest exchange market, and there are much information to affect your decision. Ac-

According to the Wall Street newsletter, the gamma value of Wall Street is too short, which disrupts the broker's hedging strategy. This may also have contributed in part to the sharp rise of some stocks, including Tesla.

In all there is a potential growth in Tesla, and I believe that Tesla stock will increase in the future 10 years.

Then we test the sensitive analysis based on the spot price, the time to maturity, the volatility, and the striking price

4.1. Spot price

First, it is necessary to consider about the market price and striking price. According to the data and the views from anticipations, and the striking price have settled at one thousand dollars. We used the binary option to construct the graph, and it showed a call option which means you gain the profits. And we assume that the spot price increased from 663 to 683, when the stock price goes up by one dollars, the option's goes up by 0.627 dollars. In addition, for a 1 per cent increase on the stock, the option price increase by 3.47%. Hence, the overall trend is an upward growth graph.

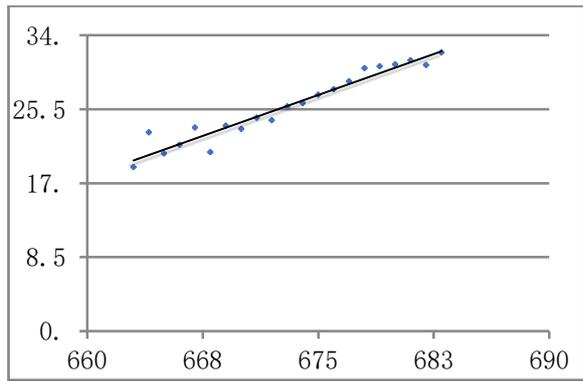


Figure 3. Spot price and call option price

4.2. Time to maturity

Second, we used time to value call option of TESLA, and the graph also showed upward just like a linear function. With the time increasing, and we will have more time to value the relationship with profits. In this graph, we estimate that one year influence the profits with upward tendency. Then, the profits increase with the time becoming longer. At last but not least, if there are more time with the stock, it would have more time to vary, becoming expensive.

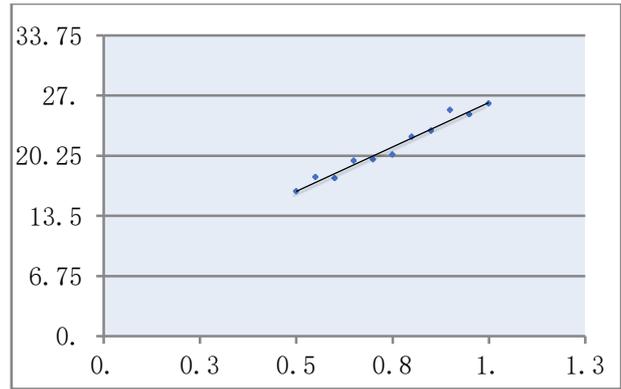


Figure 4. Time to maturity and call option price

4.3. Volatility

Third, we adopted the sigma, which is so-called volatility, to build the graph. It is generally agreed that the high risk matter usually gets along with high profits, and the TESLA is just like this pattern. And we used the number 0.8 that we got from yahoo website to estimate the number. If the TESLA has 0.25 volatility, we would get 15 dollars profits, and if it increases to 0.85 volatility, we would get 28.5 dollars profits. Through these data in this graph, we stated that if the matter has high volatility, it have more chance to hit the boundary in order to gain much more money, and vice versa. Thereby, our graph was also going up.

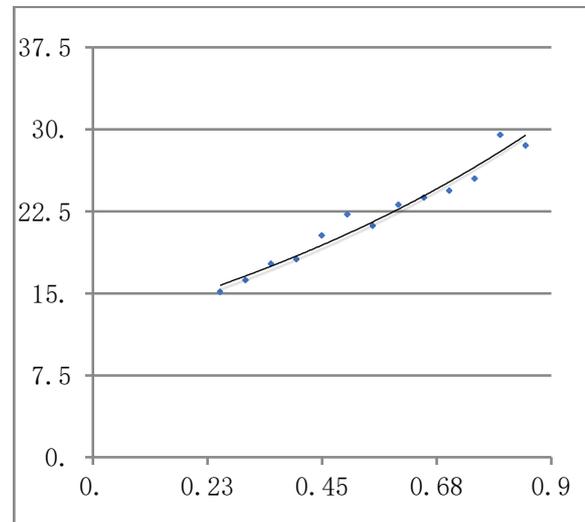


Figure 5. the impact of Stigma on the call option price

4.4. Striking price

Finally, there is an unique relationship between striking price and call option price. When the striking price goes up, the option price decreases pretty fast. Because the striking price is the boundary, once the stock price hits the boundary meant that your option is valuable. If the boundary was almost small, you would always get the profits. If the striking price goes up to 2000 dollars, which unlikely happens with low profits. As a result, the more the striking price, the lesser the

profits, and we got a graph with downward direction. There is a large span between two different striking price relative to call option price.

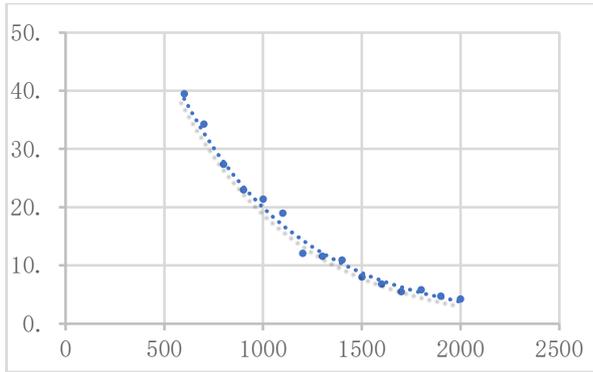


Figure 6. Striking price and call option price

5. CONCLUSION

In this whole analyzing article, we use stock price, company news, professional estimations and options product approachment to analyze the finance product of Tesla. Through the binary option is a simple way to analyse the data. The graph shows a pretty clear and easy way for people to observe. Our graph states that when the Tesla stock hit the boundary of 1000 dollars, you can gain exact profits such as 100 dollars. If the Tesla stock doesn't hit the boundary, you lose money or get nothing. In addition, we used 4 factors to make a sensitivity analysis, and we found that the tendency of the Tesla goes up. There is a downward trend for a few days, but they have affects on it. Quite opposite, we think a trend for a few days will bring upward and growth for the future, because the stock is always trading, and people will buy the stock with the downward trend. As we concern the popularity of Tesla will bring multiple kinds of investment towards the related financial product.

Furthermore, the unpredictable future statement of Tesla brings high risk. Why the binary option would be a profitable choice. The risk is fixed and hedging it can be easily done. In the future, Tesla may invent some other types of cars with more AI technology. More and more people will pay attention to Tesla. Electric car pioneer Tesla unveiled a "home battery" last week, which its founder Elon Musk said would help change the "entire energy infrastructure of the world". Some individuals and small cooperation firms prefer Tesla and invest in Tesla because of the potential of Tesla in the market.

Although the binary option would be a proper approachment for making profits on Tesla finance products, the whole data cannot show the exact future of Tesla. The flaw of the binary option is that it only earns a fixed profit or lose all the input. At the same time, the whole picture is unforeseen for normal investors. The

way Tesla itself functions is also an unpredictable indicator.

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