

# Analysis of Tesla investment based on Multiple Valuation

Shude Song\*

Department of International Business School Suzhou, Xi'an Jiaotong-Liverpool University, Suzhou, China

\*Corresponding author: shude.song20@student.xjtlu.edu.cn

**Abstract.** It is not very accurate to use multiple Valuation method to evaluate the stock of a company with a special structure like Tesla. In this paper, multiple valuation is used to evaluate Tesla, but some improvements are made to the traditional process. According to the cost of revenue structure of Tesla, Tesla is regarded as a combination of a new energy company and an ordinary car company. Then, the two parts are evaluated separately, and then the fair value of Tesla is calculated by adding these two-part after making some adjustments. Finally, it is concluded that the current stock price of Tesla is overvalued, and investors should pay more attention when investing. This may be because people are overoptimistic about innovative companies such as Tesla, leading to part of the bubble.

**Keywords:** Tesla, stock price, improved multiple valuation.

## 1. Introduction

Tesla shares have continued to fall since 2022, falling to \$663.9 on May 20 from \$1,208 at the start of the year. It's down nearly 40%. COVID-19 has been around for a long time, which has severely affected the economic systems of the United States and China. That means it affects domestic stock market indexes [1]. In addition to U.S. inflation and the big drop in tech stocks, another major factor is the recent behavior of Tesla CEO Elon Musk. Musk's actions since April 4, when he was announced as Twitter's largest shareholder, have raised concerns about Tesla's investment. During that time, Musk announced a \$44 billion deal to take Twitter private, in addition to selling \$4.4 billion of Tesla stock to buy Twitter. However, there is a clear correlation between Musk's engagement on Twitter and Tesla's stock price, according to research in the long run [2]. Thus, Musk's actions could have a positive impact on Tesla's stock price in the long run.

In the stock market, technical analysis is widely used by many financial practitioners and finance professors [3]. Technical analysis usually refers to the use of past changes in stock prices to predict future movements in stock prices. The Combination of the Elliot Wave and Fibonacci series is very helpful in determining stock trends [4]. It mainly analyzes the market factors themselves, rather than focusing on other factors [5]. An important assumption of technical analysis is that history repeats itself. A big flaw in technical analysis is that it ignores the value of the company itself, known as fair value. It simply emphasizes the impact of people's psychological gaming on stock prices [5]. Use this idea to go back to the original question and evaluate Tesla's recent stock price move. Technical analysis suggests the stock will continue to fall, in part because of investors' reaction to Musk's acquisition of Twitter and tesla's sell-off. These actions can have some negative psychological impact on investors to be bearish on Tesla stock. In addition to technical analysis, investment in Tesla should also be viewed dialectically through fundamental analysis.

Fundamental analysis is generally used to estimate the fair value of a company through macroeconomic analysis, government policies, and a company's financial statements. Fundamental analysis is generally divided into top-down and bottom-up. Top-down means from macro to micro, and bottom-up means from micro to macro [6]. It can also observe the data in the annual report to help investors understand the value of the company's assets and operations [6]. It is a very useful method for long-term investment analysis. Fundamental investors believe that if the current market price of a financial product is below its true value, then it is an investment opportunity [7]. Furthermore, they argue that current prices are temporary and that sooner or later the price of a product will return to its fair value [7]. Fundamental analysis is for long-term investment. It can assess a company's growth potential by analyzing the company's annual R&D costs, intellectual property

rights, and so on. The fundamental value given by DDM-APT method describes both stock price trend and stock price fluctuation [8]. It allows investors to make the best decision by comparing different companies.

Under the background that technical analysis is generally bearish on Tesla's stock at present, this paper will adopt the multiple valuation method in fundamental analysis to give some reference for Tesla's long-term investment. In multiple Valuation methods, companies similar to the target company in business type, company size, and other dimensions are firstly found. Then calculate the average or median of multiple selections for these companies. Finally, the calculated value is multiplied by the corresponding index of the target company. This can assess whether the target company's stock price is overvalued, undervalued, or fair value. The main contribution of this paper is to use the multiple Valuation method to evaluate Tesla stock price more comprehensively after considering tesla's special income structure. It is of great reference significance for investors to invest in Tesla. The remaining of this paper is organized as follows. Section II introduces the valuation without considering Tesla's special structure and shows the big difference from reality. Section III describes a more comprehensive valuation of Tesla stock price considering the special structure of Tesla. Finally, some discussion of the results is described.

## 2. Valuation analysis of Tesla based on traditional multiple Valuation

### 2.1 Choice of Comparable Companies

The first step is to select companies similar to Tesla as Comparable companies. When it comes to Tesla, people's first impression is that it is a car company. Tesla's stock price is significantly expensive compared with that of most car companies. Therefore, it is assumed that Tesla's stock price is high. Next, the multiple Valuation method is used to check whether the hypothesis is correct. Start with a list of companies in the automotive industry and then select comparable companies from that based on several metrics. First, nine automobile enterprises are selected, as shown in the figure below.

**Table 1.** Comparable Companies' selection criteria

<b>Tesla</b>	<b>stock price now 714.84</b>		
<i>selected financial data for Tesla (June. 6, 2022)</i>			
variable	Tesla	Volkswagen AG	Toyota
enterprise value (\$billion)	717.9	240.93	26.28
BV (Debt) (\$ billion)	7.03	182.22	1359.63
BV (Equity) (\$ billion)	35.41	158.91	3929.67
Cash&Cash equivalent (\$ billion)	18.01	67.24	594.83
EBITDA (\$ billion)	12.94	53.57	265.01
employees	110000	313010	366283
dividend per share	0	7.83	1.41
shares outstanding (billion)	1.04	5.9	1.37
EBITDA in 2019(\$ billion)	2.17	45.01	398.4
EBITDA in 2020(\$ billion)	4.22	40.55	412.88
EBITDA in 2021(\$ billion)	9.63	49.43	403.68
Beta (market risk)	2.13	1.42	0.64

Yahoo Finance, <https://www.morningstar.com>

<b>Ford Motor</b>	<b>Honda</b>	<b>Peugeot</b>	<b>General Motors</b>	<b>Nissan</b>	<b>Geely</b>	<b>Renault</b>
149.86	75.83	4.11	139.79	0.66	15.13	49.08
136.98	7589.74	0	109.81	0	0	0
45.08	10036.32	6.27	67.06	170.12	65.57	26.58
41.23	3097.81	0.03	26.26	0.62	19.8	21.03

22.38	1753.25	0.6	24.16	0	11.82	6
186000	211374	208780	155000	132324	38000	160000
0.4	0.93	2.92	0	0.08	0.03	0
3.95	1.71	24.84	1.46	1.96	10.02	0.29
18.37	1714.29		22.34	19.66	13.5	5.7
16.6	1514.48		22.01	18.97	12.1	-2.51
30.8	1552.17		25.72	10.75	11.82	6
1.15	0.96	1.64	1.22	1.45	1.24	1.9

Yahoo Finance, <https://www.morningstar.com>

Nine companies, including Volkswagen AG, Toyota, Ford Motor and so, are selected from the market. The next step is to select the companies that are closest to Tesla. The first dimension is analyzed from the dimension of company size. Enterprise value can better measure the size of a company. The figure above shows that Tesla's enterprise value is 717.9billion. According to this data, enterprises with much smaller enterprise value than Tesla can be excluded by the exclusion method. Obviously, the enterprise value of Toyota, Honda, Peugeot, Nissan, Geely Automobile Holdings Ltd, and Renault is an order of magnitude smaller than Tesla. The number of employees is also a significant reflection of the size of a company. The number of employees in Geely Automobile Holdings Ltd is also significantly smaller than other companies. For most investors, there are two ways to make money investing in stocks. One is to wait for the stock to increase in value, and then buy low and sell high to make a profit. The other is to make a profit through dividends. Some investors who want to profit from dividends pay more attention to how much and how often dividends are paid. Investors use a more commonly used method, the discount dividend model, to calculate the current price. It can be seen from the above data that Tesla did not announce dividend payments. However, the dividends per share of Volkswagen AG and Peugeot are relatively large and if investors use the dividend discount model to calculate the stock price, it will have a larger impact. After analyzing the rate of return, risk comes naturally to mind. Beta represents market risk. A rational investor would choose diversification. Systemic risk cannot be dispersed in an efficient portfolio. Therefore, the higher the systemic risk, the higher the rate of return investors will demand accordingly. The market risk of Toyota and Honda is lower than that of Tesla obviously. The final step is to analyze the company's growth rate, which will affect investors' judgment of the company's prospects and thus affect the stock price. The chart above shows the change in EBITDA from 2019 to 2021, which indirectly reflects the company's growth. Tesla's EBITDA grew from 2.17billion in 2019 to 9.63billion in 2021 (table 1). As shown in the above data, the EBITDA of Honda, Peugeot, Nissan and Geely declined in these three years, which means that the growth rate of the companies is negative. Therefore, these companies can be excluded. Based on the above analysis, Volkswagen AG, Ford Motor and General Motors should be selected as Tesla's Unavailable companies. Volkswagen was not excluded on the basis of dividend per share because for experienced investors, the main source of income from stock trading is not dividend income.

## 2.2 Valuation results of Tesla using three multiples

Next, the three multiples of P/S ratio, P/E ratio and Enterprise value/EBITDA are used to analyze whether Tesla stock is overvalued, undervalued or fair value. The P/S ratio, P/E ratio and Enterprise value/EBITDA of these companies are shown in the figure below.

**Table 2.** the value of multiples

	Tesla	Volkswagen AG	Ford Motor	General Motors
P/E ratio	96.85	5.76	4.79	6.37
P/S ratio	12.12	0.37	0.38	0.43
Enterprise value/EBITDA	52.31	4.21	6.59	5.6

Yahoo Finance, <https://www.morningstar.com>

The first multiple is the P/E ratio. The average P/E ratio of comparable companies should first be calculated, which is 5.64 (table 2). And then multiply that by Tesla's earnings per share, which is 7.4. Finally, it can be concluded that based on P/E Multiple, the fair value of Tesla's stock price is \$41.736. The second multiple is P/S ratio. Similar to the previous steps, calculate the average of comparable Companies P/S and multiply it by Tesla's sales per share. Sales per share is calculated by dividing the sales revenue by the number of common shares. At P/S multiple, Tesla shares have a fair value of \$23.52. The final multiple is enterprise value /EBITDA. The first step is to calculate the average enterprise value/EBITDA of comparable companies as well. And then multiply the average by EBITDA of Tesla. The final multiple is not the fair value of stock price, but the fair value of enterprise value. So as to indirectly judge whether Tesla's stock price is fair. Finally, the fair value of Tesla's enterprise value is \$70.74.

Tesla is now trading at \$714.84. Compared with the fair value calculated above, it shows that the hypothesis is correct. Tesla's shares are overvalued. However, the above results reflect a problem that the fair value calculated by P/E ratio and P/S ratio differs by nearly 50%. This is due to tesla's excellent cost management and higher profit conversion rate than other companies. The figure below shows the net margins for each company.

**Table 3.** Adjusted value based on P/S ratio

	Tesla	Volkswagen AG	Ford Motor	General Motors	weighted average
net margin	13.51%	7.25%	8.59%	6.78%	7.48%
revenue (billion)		250.57	134.59	130.51	
net margin multiplier	1.81				
adjusted P/S value	42.477 2				

Yahoo Finance, <https://www.morningstar.com>

To eliminate this effect, the Comparable Companies' net margins were first weighted and averaged based on sales revenue. Then divide tesla's net margin by the weighted average value. That can get a multiplier. Then, the fair value obtained before is multiplied by this multiplier, and the fair value at the level of Tesla net margin can be obtained, which is \$42.48 (table 3).

### 3. Valuation analysis of Tesla based on the improved Multiple Valuation

#### 3.1 The choice of Comparable Companies after considering Tesla's special structure

There is a more serious problem. If Tesla's fair value really is in the mid-40s, why are so many investors willing to pay around \$700 for it? On the one hand, tesla is an electric car, which is different from traditional gasoline cars. Under the theme of environmental protection, Tesla is obviously more advantageous. Most investors believe that pure electric cars are responding to the general trend of national policies. Sales of electric cars in the US are growing by 59% a year [9]. Electric vehicles are an effective way to deal with future environmental degradation and energy shortage [9]. Tesla shares rose as supply and demand shifted. But does that mean tesla's stock is all in a bubble? Here's another

reason Tesla's stock is trading so high. According to the analysis of Tesla's annual report, tesla is most different from traditional car companies in that its income source is not only car sales but also the production and storage of new energy. According to the annual data of previous years, the cost of sales of production and storage of new energy accounts for about 20% of the total cost of sales. Therefore, in order to more accurately estimate the fair value of Tesla's stock price, it can be assumed that Tesla is an organic combination of a new energy company and an automobile enterprise. Thus, repeat the above steps to identify new energy companies in the market that are comparable in size to the adjusted Tesla as Comparable companies. The enterprise value of Tesla is 717.9 billion. Since 20% of tesla's cost of sales is related to new energy, the adjusted enterprise value is multiplied by 20%. The adjusted enterprise value is 143.58 billion (table 4).

**Table 4.** Comparable Companies' selection criteria

variable	Tesla	Siemens AG	Panasonic Corporation
enterprise value (\$billion)	143.58	142.82	26.58

variable	GCL	Archer-Daniels	Glencore	Shell
enterprise value (\$billion)	10.08	63.05	121.3	266.97

Yahoo Finance, <https://www.morningstar.com>

As shown in the figure above, six new energy companies have been selected. As the enterprise value of Panasonic Corporation and GCL is much less than the adjusted enterprise value of Tesla, these two companies are not comparable companies.

### 3.2 Valuation results of Tesla using three multiples

Next, three multiples are still used to calculate the fair value of Tesla's stock price. The first is P/E ratio. First figure out the mean of comparable companies' P/E and then multiply that by Tesla's earnings per share. The average P/E ratio is 16.42 (table 5). The fair value based on P/E ratio is \$121.53. The second multiple is P/S ratio. The average P/S calculated for comparable companies is 0.775 (table 5). Take the average times Tesla's sales per share. The fair value is \$46.34. The last multiple is enterprise/EBITDA. Multiplying tesla's EBITDA by the average of Comparable companies, the fair value of the enterprise is 70.74billion. There is still a problem here, that is, the fair value calculated with P/S ratio is much lower than the fair value calculated with P/E ratio.

**Table 5.** the value of multiples

	Tesla	Siemens AG	Archer-Daniels	Glencore	Shell
P/E ratio	96.85	19.57	16.48	18.55	11.09
P/S ratio	12.12	1.39	0.53	0.4	0.78
Enterprise value/EBITDA	52.31	10.61	12.03	7.65	4.2

Yahoo Finance, <https://www.morningstar.com>

Looking at the net margin of each company in Morningstar, it can be seen that Tesla is higher than other companies. Prove tesla's better cost management. The weighted average of net margin is 5.35% (table 6) based on sales revenue. A multiplier was obtained by dividing Tesla's net margin by the weighted average. The multiplier is multiplied by the original fair value to obtain the adjusted fair value without the cost management factor.

**Table 6.** Adjusted value based on P/S ratio

	Tesla	Siemens AG	Archer-Daniels	Glencore	Shell	weighted average
net margin	13.51 %	7.75%	3.42%	2.44%	7.43 %	5.35%
revenue (billion)		67.07	90.01	203.75	290.04	
net margin multiplier	2.53					
adjusted P/S value	117.11					

Yahoo Finance, <https://www.morningstar.com>

As the above calculation considers Tesla as a combination of a traditional car company and a new energy company, the fair value of Tesla's stock price can be obtained by amplifying the results of the two multiple valuations in equal proportions and then adding them together. The first multiple is P/E ratio. Add the \$41.74 (as shown in section 2.2) got the first time divided by 80% and the \$121.53 (as shown in section 3.2) got the second time divided by 20%. Finally, based on P/E Multiple, the fair value of Tesla's stock price is \$659.825. This value less than Tesla's current share price, making it overvalued. The second multiple is P/S ratio. Using the same method, the fair value of Tesla's stock price is \$638.65 based on P/S Multiple. It also suggested that the stock value of Tesla is overvalued. Finally, enterprise value/EBITDA, the fair value of Tesla's enterprise value is 646.325billion after calculation. The enterprise value is also less than enterprise value of Tesla.

#### 4. Discussion

Tesla shares are overvalued, as predicted. When Tesla went public in 2010, DFCF calculated its fair value to be \$13.11, which was overvalued at the time [10]. Back more than ten years ago, Tesla was a very innovative company, and now Tesla is also a benchmark in the field of innovation. That's probably why Tesla's stock has remained overvalued since it went public. Investors will get to know Tesla better as the company matures. They won't quote blindly like they did before. Tesla has been overvalued since its listing, of course, there are more or less some bubbles in it, but its ability to maintain such a high price has to be considered. The fair value of Tesla calculated by using the Multiple Valuation method in this paper should be about \$650. Therefore, the calculations suggest that there is still a bubble, and investors should be cautious. Due to the particularity of Tesla, it is different from traditional companies in the automobile industry, and the comparative analysis is not very accurate [10]. Therefore, this article improves some aspects of multiple Valuation.

#### 5. Conclusions

According to the above multiple Valuation of Tesla's stock price, it can be seen that tesla's stock price is currently overvalued. According to the financial consensus, the price of a financial product is equal to its fair value in the long run, so Tesla shares will continue to fall for some time to come. This is because Tesla, as an emerging technology company, has a certain bubble. Investors are advised to short Tesla shares or temporarily stop buying or selling the stock. This paper made some improvements in the process of selecting the average value of the same industry and made up for the gaps in previous studies. Unlike previous studies, this paper makes a bold assumption in selecting Comparable Companies based on Tesla's unique revenue structure, and sees Tesla as a combination of a new energy company and a traditional car company. That makes a lot of sense for an accurate valuation of Tesla's stock price. This paper also has significant limitations. It assumes that Tesla is a combination of a new energy company and an ordinary car enterprise only through the composition structure of cost of revenue. This is hasty. But it could be instructive for future researchers. The

subsequent research can more accurately and reasonably split tesla and other companies with special structure through other dimensions, so as to select Comparable companies more reasonably. Thus, multiple valuation can be more accurate.

## Reference

- [1] Yang Jinyu, Jia Ziyi, Mao Yunxiang. The Relationship Between the Chinese Stock Market, the US Stock Market, and Some Other Economic Indexes Under the COVID-19 Pandemic[J]. Journal of Physics: Conference Series, 2021, 1936(1):012005 (9pp).
- [2] Kim D, J Lee, J Lee, et al. Elon Musk's Twitter and Its Correlation with Tesla's Stock Market[J]. International Journal of Data Science and Analysis, 2021, 7(1):13.
- [3] Xu Song, Yang Yunjiao. Fractional Black-Scholes Model and Technical Analysis of Stock Price[J]. Journal of Applied Mathematics, 2013, (2013-12-11), 2013, 2013:1-7.
- [4] L Ee K, Mohamad J, Bakri A K. Technical Analysis and Stock Price Prediction? Evidence from Malaysian Stock Market. 2016.
- [5] Bonga W G. The Need for Efficient Investment: Fundamental Analysis and Technical Analysis[J]. Social Science Electronic Publishing, 2015.
- [6] Huan N V, Hang N T. Combination technical between fundamental analysis and technical analysis to making investment decision in securities. 2017.
- [7] S Bülow. The Effectiveness of Fundamental Analysis on Value Stocks – an Analysis of Piotroski's F-score. 2017.
- [8] Jawadi F, Prat G. Equity prices and fundamentals: a DDM-APT mixed approach[J]. Review of quantitative finance and accounting, 2017, 49(3):661-695.
- [9] Ajidarma P, D Irianto. Application of Bayesian Additive Regression Trees to Analyze The Growth of United States Electric Automobile Industry[J]. IOP Conference Series Materials Science and Engineering, 2019, 598:012035.
- [10] Cecere F, Gambino G, Mollura M. Tesla Motors IPO The next bubble. 2016.