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Tesla vs. its Stock Price: “Herd Theory” at work?

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Abstract

Since its inception in 2003, Tesla, Inc. has striven to be more than simply an electric automobile manufacturer. Since its first release in 2008 (the luxury Roadster), the company has introduced several additional high-end models as well as a much anticipated mid-priced model. Its vehicles consistently receive enthusiastic reviews from consumer analysts and industry publications alike. Perhaps as a reflection of its continued innovation and product-line expansion, as well as investor optimism regarding the company’s future prospects, its stock price has risen to extraordinary levels. However, despite all of this apparent success and highly-valued stock, Tesla has generated relatively little profit to date. This research paper analyzes some of the factors that have led to such a high stock valuation. It examines the background of the company from inception to the present, the impact that its charismatic CEO Elon Musk has had on the stock price, and whether or not “herd behavior” could be at play.

Key words: Investor optimism, herd theory, behavioral economics, social media

JEL Codes: Business Economics (M2), Financial Markets (O16), Behavior Economics (G02)

Key Takeaways:

1. Tesla's stock has grown at tremendous rates over the last ten years, remarkably outpacing its actual company growth.
2. Elon Musk, the company's charismatic CEO, has been very adept at using his own "larger-than-life" personality as well as such tools as social media to add to the company's mystique and perhaps even to its meteoric stock price rise.
3. Herd behavior could also play a part, as investors see others buying the stock and assume either that they have a better perspective or know something that they do not and also purchase the stock based on this.

1. Introduction

Since Tesla's inception, the stock price has done exceptionally well. It's charismatic and visionary CEO, Elon Musk, has done much to shape this company from its infancy. Since releasing their first automobiles in 2008, the company has introduced several additional models as well as a much anticipated mid-priced automobile. Its automobiles consistently receive rave reviews from consumer analysts and publications alike. Perhaps reflecting the overall charisma, optimism, and media attention surrounding the brand, its stock price has risen to astonishing levels over the last decade. However, despite all of this apparent success and highly-valued stock, Tesla has made relatively little net profit up to this point. As Thomas & Maine (2019) state, the unusual success of Tesla offers a unique opportunity to examine a technology startup which has been able to establish a significant foothold in the highly competitive automotive industry.

Since the days of the legendary stock analyst Benjamin Graham, savvy, long-term investors have always sought to value a company's stock according to certain immutable metrics such as the Price to Earnings Ratio, its share of the respective market, units produced, annual growth, and performance relative to its competitors. A company's shares were then deemed to be under- or over-valued according to where these fundamentals stood on their own as well as to those of its competitors. However, with Tesla, it would seem that these traditional ideas do not fully apply.

This research paper analyzes some of the factors that have led to such a high stock valuation. It examines the company from its inception to the present day, the impact of its CEO and charismatic leader, Elon Musk, and the behavioral economic theory of "Herd Behavior" as we delve into what would seem to be a disconnect between Tesla's economic fundamentals and its ever-increasing stock price. We also compare the economic fundamentals of Tesla to two of its competitors in an attempt to paint a clearer picture of this apparent separation of stock price and company fundamentals and to determine if there could be other factors at work.

2. Literature Review

2.1 Company background, its CEO, & mission

"You'll be able to travel for free, forever, on pure sunlight"—Elon Musk.

Tesla Motors was founded in 2003 and named after Nikola Tesla, an early pioneer of the electric motor (Conti, 2017). The company was founded by a group of engineers in Silicon Valley with the vision of accelerating the world's transition to sustainable transport. To that end, Tesla Motors has created “cars without compromise”—all-electric vehicles that offer all of the torque, power, and style of high-end automobiles with none of the emissions (Hess & Andiola, 2018). The company's mission is “to accelerate the advent of sustainable transport by bringing compelling mass market electric cars to market as soon as possible” (Tesla Motors, 2015). Tesla's CEO, Elon Musk, is the leader of that effort. Tesla is now the world's leading producer of all-electric motor vehicles (Markham, 2019). According to Musk, “Our goal when we created Tesla a decade ago was the same as it is today: to drive the world's transition to electric mobility by bringing a full range of increasingly affordable electric cars to market” (Stringham et al, 2015).

Tesla's first release was the Roadster in 2008, which offered 0 to 60 mph acceleration in 3.7 seconds and a range of 245 miles per charge of its lithium-ion battery. In 2012, Tesla launched the Model S, a four-door sedan that was named Motor Trend's 2013 Car of the Year. In 2016, Tesla expanded its product line to include the Model X, a crossover vehicle, and the Model 3, a lower-priced vehicle with a 2017 expected release date. Despite these accolades, Tesla does not limit its vision to only automobiles. Instead, the company describes itself as “a technology and design company with a focus on energy innovation” (Tesla Motors, 2016b).

2.2 Current & Future Opportunities and Challenges

It took Tesla only 10 years and 30,000 vehicles to pass the market valuation of car-making giant Fiat and reach half of the value of General Motors — a company that has manufactured 450 million cars over its more than 100 years of existence. Following such grandiose announcements as being able to connect the car to the Internet and building the world's largest “Gigafactory” for batteries, Tesla's market capitalization rose to \$30 billion (Hettich and Muller-Stewens, 2017). Moreover, by 2018, its Model 3 not only had the #1 market share position in its segment in the US, it outsold all other mid-sized premium sedans combined, accounting for 52% of the segment overall (Huang, 2019). Moreover, Tesla has been ranked by several business surveys as one of most innovative companies of recent years, with some of the others being Alphabet, Amazon, Apple, Microsoft, Samsung, and Facebook (Claudia, 2019).

What elements could have contributed to this spectacular rise? One of the most significant factors would undoubtedly be that of environmental sustainability. Over the last several decades, the idea of sustainability has one of the foremost issues of both corporations and academia. People are becoming conscious of the impact that pollution has on the environment and of the fact that transportation, the second largest source of carbon emissions globally, is a major contributor to it (Ahmad & Khan, 2019). Moreover, according to Cooperrider (2017), “the quest for a flourishing Earth is the most significant Appreciative Inquiry and organization development opportunity of the 21st century, because of the concept we now call ‘mirror flourishing’ – it's about giving beyond ourselves, and it is the most potent force on the planet”. Tesla is viewed by both consumers and investors as a company that has directly emerged out of this phenomenon.

However, despite these accolades and remarkable growth, Tesla is not without its challenges. One of the foremost of these is that Tesla needs to greatly reduce their cost structure in order to eventually get out of debt. It is normal that all companies incur debt as they grow, but

Tesla has had a difficult time balancing their debt throughout their existence. If they continue to operate at such high costs, and subsequently be forced to sell their product at such a relatively high price, it will be difficult for them to eventually become profitable for the long-term. Despite great appeal to their target market, the high price point makes it nearly impossible to sell a sufficient number of units to prove financially viable (Alghalith, 2018).

Another challenge that Tesla faces going forward is that it is not “the only game in town” at this point—other mainstream automobile manufacturers are producing electric vehicles as well. Nissan, Ford, Kia, Volkswagen, and Chevrolet have all begun to produce electric vehicles of different styles and models. The Chevrolet Bolt, with a base price of approximately \$37,000 and a range of nearly 240 miles, seemed to be a direct competitor to the Tesla Model 3 (Fisher & McCabe, 2019). Moreover, upstart Rivian is currently in the process of producing an all-electric pickup and plans to have it to market by early 2021 (Wayland, 2020).

2.3 Impact of CEO Personality and Social Media

Elon Musk’s charismatic personality and engineering abilities have been beneficial in fostering a brand association of innovation with Tesla through his various companies. However, recently some of Musk’s activities, including his social media posts, have raised questions regarding the value of his association with the company. Moreover, the fallout of some of Musk’s actions resulted at one point in a shareholder challenge to his role as CEO and chairman of the board. Although the vote ultimately failed, shareholders were asked to consider taking the chairmanship from him in an effort to mitigate his actions. Musk has undoubtedly been a benefit to Tesla, but in the opinion of some, his recent activity has given pause to critical evaluation regarding the limits of associations that might otherwise amount to ‘hero-worship’ (Fisher & McCabe, 2019).

Market reactions are driven by business events and expectations from the market rather than the follow-up reporting by financial news media. Moreover, social media accounts of high-visibility companies and personalities, such as that of Tesla and Musk himself, have been found to be viable sources of market information for day-traders and shareholders. However, according to Strauss & Holmes-Smith (2019), “impetuous communication via social media channels could have deterrent effects on the market valuation of a listed company”. Furthermore, the SEC has even attempted to censor Musk’s “tweets” on Twitter concerning his often-controversial views on the role and success of Tesla’s electronic automobiles in combating climate change, one of the most critical political and social issues of our time (Markham, 2019). Lastly, other studies have found that negative tweets tend to be associated with significant stock price declines, whereas neutral and positive tweets incur weakly positive stock price reactions (Ajjoub et al, 2020).

The bottom line is that so far, Tesla has been relatively successfully in leveraging key influencers to drive the media narrative that has been described by some as ‘cult-like’. Tesla will continue to have a challenge in “balancing their innovation narrative with the reality that they have a reputation amongst analysts for missing promises” (Fisher & McCabe, 2019). In other words, the challenge of maintaining their reputation for excitement and innovation with being realistic with both their shareholders and the public.

2.4 Company Fundamentals and its Stock Price

Tesla Motors recently became the most valuable automotive manufacturer in North America by market capitalization. Tesla Motors has become a major player in the automotive industry, and is now the pre-eminent electric vehicle manufacturer in the world (Thomas & Maine, 2019). Since its inception, Tesla has always made decisions that deviate from traditional business models in the automobile industry. Despite these dynamics, however, profits have been marginal (Hettich and Muller-Stewens, 2017). Nevertheless, since the 1990s, financial markets have shown particular excitement for tech companies-- it seems that many tech companies have benefited from an inflated expectation for profit (Cinti, 2017). Furthermore, the gradual shift of consumers towards the importance of environment-friendly automobile options has helped to increase the number of orders and also turned the attention of other car manufacturers to observe closely the happenings in this company (Mehta & Bhavani, 2018). Moreover, there is a growing body of anecdotal research that suggests that the perceptions of firms' products influence their market valuations. In other words, holding equity in companies that engage in "socially desirable" activities yields positive consumption benefits, while investing in "sin stocks" yields the reverse (Luo & Subrahmanyam, 2019).

In that vein, Tesla has been described as a "story stock", which is a company whose value is determined by its future prospects and favorable press coverage rather than by its assets, net income, etc. Moreover, many times the fundamental value of a stock is erroneously thought to be the same thing as market value. Many times with these kind of stocks, the intrinsic value is not reflected in the price of the share, since it may be much higher even if the fundamentals are conflicting. Story stocks' prices primarily reflect their future, which may diverge from its current growth rate (Nobile, 2019). For example, in May 2016, Tesla's management announced that the company would issue new shares in order to fund an accelerated roll-out schedule for its Model 3 sedan, due out in 2017. However, a key question for investors was whether, at its then current price, whether Tesla represented a good investment with target prices ranging from \$160 to \$500 a share. (Gilson & Abbott, 2017).

To further illustrate, the enthusiasm surrounding Tesla products is evidenced in the sharp increase of their stock price following the original 2017 announcement of the Model 3, in which their market capitalization briefly surpassed both Ford and GM. However, the fundamentals underpinning this valuation were based upon envisioning a future for the company that perhaps didn't align with reality at that point. For example, in a recent five year period, Ford reported net income of about \$26 billion while Tesla lost \$2.3 billion. This same period saw Ford generate almost \$152 billion in revenue, compared with Tesla's \$7 billion. Lastly, Tesla sold approximately 40,000 vehicles in 2015, the same amount that Ford sells in a several week period (Fisher & McCabe, 2019).

In sum, Tesla's financial performance has continued to present challenges between the company's current standing vs. where it aspires to be. While their automobiles have always been popular as a niche market player, financial weakness and continued losses have beleaguered the firm since its inception. As one result of this, in 2014, Tesla's credit rating was downgraded to junk status due to "narrow product focus, a concentrated production footprint, small scale relative to its larger automotive peers, limited visibility on the long-term demand for its products, and a limited track record in handling execution risks that could arise in managing high volume parallel

production,” (Udland, 2014). Moreover, as of 2018, Tesla’s credit rating was given a grade of B3 by Moody’s, indicating that the company is, “considered speculative and are subject to high credit risk,” (Jones, 2018).

2.5 Herd Theory and Tesla

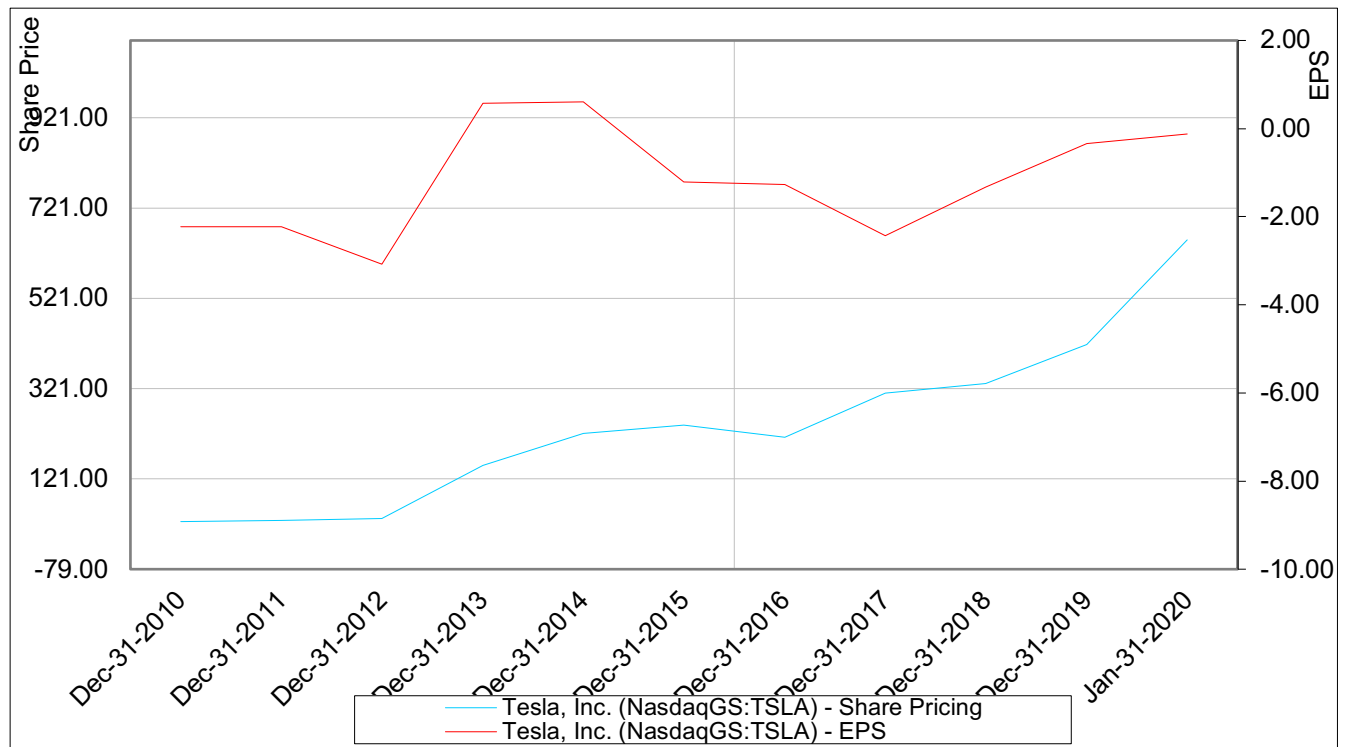
Herding can be defined as “the predisposition to imitate the actions of others while making an investment decision”. In other words, herding refers to the actions taken by an investor in order to be consistent with the actions of others. Herding or herd behavior corresponds to the action of investors who ignore their own private information to follow the collective behavior, even if this action is not supported by fundamental information (Vo & Phan, 2019).

The presence of a herding element strongly contradicts the existence of the Efficient Market Hypothesis (EMH) which states that an efficient market (such as the US financial markets) should immediately reflect any relevant information into the stock price of a company. One of the main factors causing such abnormalities are behavior-based anomalies. Herd behavior can be attributed to either psychological reasons or some rational factors such as lack of information, perceiving others to be more informed, incapability of processing the information, or the belief of better information held by others. (Goel, 2019).

There exists an exhaustive literature on the topic of herding. One scholarly camp argues that herding arises from investors’ psychological bias. For example, when investors suppress their prior beliefs and blindly follow others’ trading strategies. Another school of thought contends that herding can also occur among rational market participants. The actions of informed traders might reveal inside information, which induces outsiders to follow informed traders’ investment strategy. The shortage of reliable and timely information, upon which decisions by the investor are made, is one of the primary reasons for herd behavior (Chong et al, 2017).

3. Methodology and Data

Methodology for this analysis will be done on an analytical/”case study” basis. Figures and tables (all derived from the authors’ statistical analysis) will be presented which illustrate the above concepts and discussion will follow. Figures will illustrate Tesla’s financial data, such as Earnings per Share, Share Price, and Market Capitalization (among other items) and will compared to two other auto manufacturers, Ford and BMW. In this way we will be able to gain some insight into the difference between Tesla and two of its competitors (one from a more traditional manufacturer and the other from a luxury manufacturer), which may be indicative of the automobile market as a whole.

Figure 1- Tesla: Share Price vs. Earnings per Share

As we see from Figure 1, over the most recent ten year period, Tesla's stock price rose from minimal levels (approximately \$26/share) at the end of 2010 to roughly \$418/share at the end of 2019. Moreover, although not shown in this figure, the stock has continued to rise to over \$1400 per share as of summer 2020. However, with the exception of two short periods (2013-2014), the company's Earnings per Share have always been negative, frequently by several dollars per share. Table 1 illustrates the above in a more detailed, numerical format:

Table 1: Tesla- Share Price vs. Earnings per Share (USD)

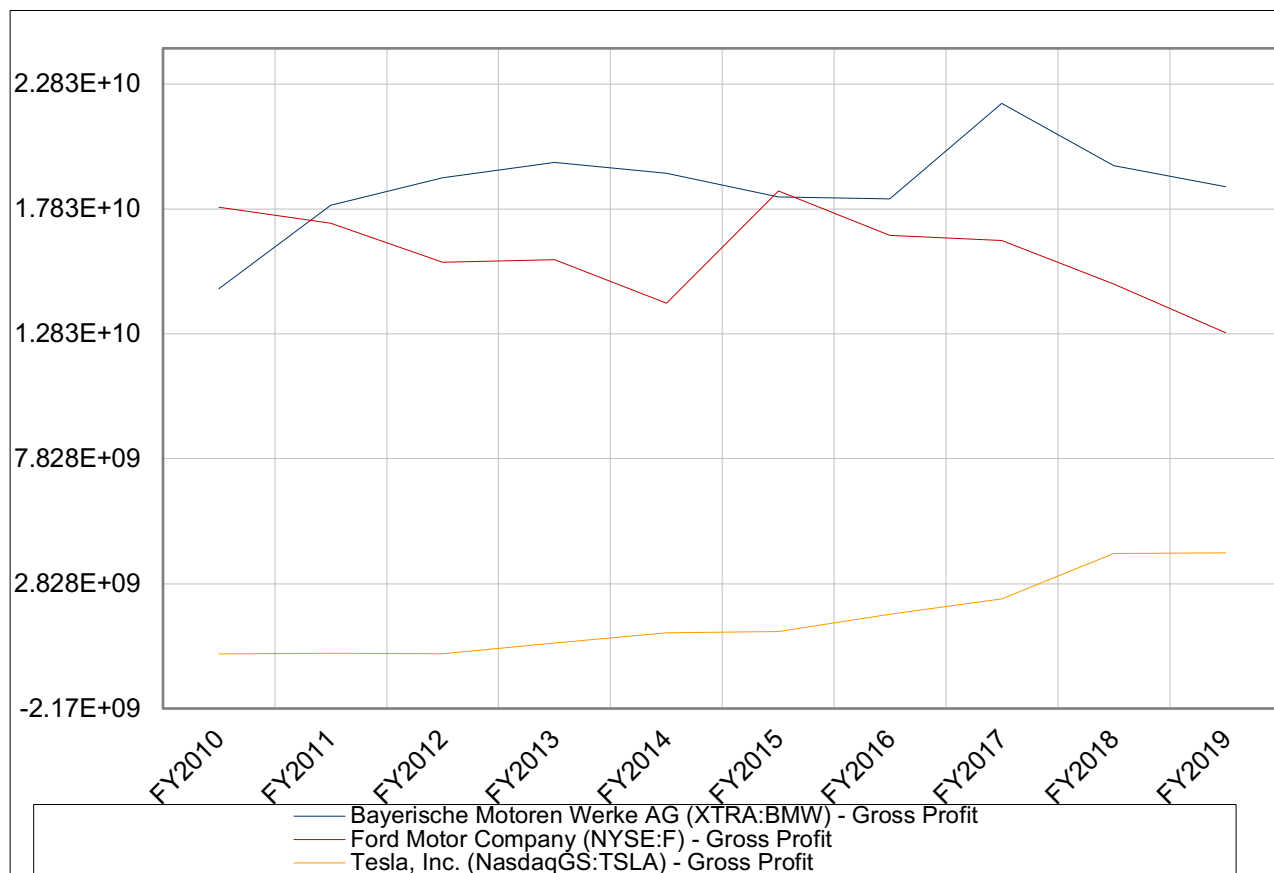
Dates	Tesla, Inc. - Share Price	Tesla, Inc. - EPS
Dec-31-2010	26.63	-2.22
Dec-31-2011	28.56	-2.22
Dec-31-2012	33.87	-3.08
Dec-31-2013	150.43	0.58
Dec-31-2014	222.41	0.61
Dec-31-2015	240.01	-1.21
Dec-31-2016	213.69	-1.26
Dec-31-2017	311.35	-2.43
Dec-31-2018	332.80	-1.33
Dec-31-2019	418.33	-0.34

The following presents Tesla's Stock Market Value to Book Value ratio in comparison to two of its primary rivals.

Table 2- Tesla vs. BMW and Ford: Stock Market Value to Book Value Ratios

Dates	Tesla	BMW	Ford
Dec-31-2010	11.29x	1.78x	NA
Dec-31-2011	10.12x	1.31x	6.84x
Dec-31-2012	47.62x	1.66x	2.62x
Dec-31-2013	32.68x	1.66x	2.97x
Dec-31-2014	29.10x	1.60x	2.28x
Dec-31-2015	23.90x	1.57x	2.04x
Dec-31-2016	11.94x	1.29x	1.53x
Dec-31-2017	11.10x	1.09x	1.49x
Dec-31-2018	12.66x	0.82x	0.83x
Dec-31-2019	12.47x	NA	1.04x

As we see from Table 2, market value as a multiple of book value is vastly higher with Tesla vs. its competitors. This begins to paint a picture of other influences (beyond company fundamentals) having an impact on Tesla's stock price.

Figure 2- Tesla vs. BMW and Ford: Gross Profit

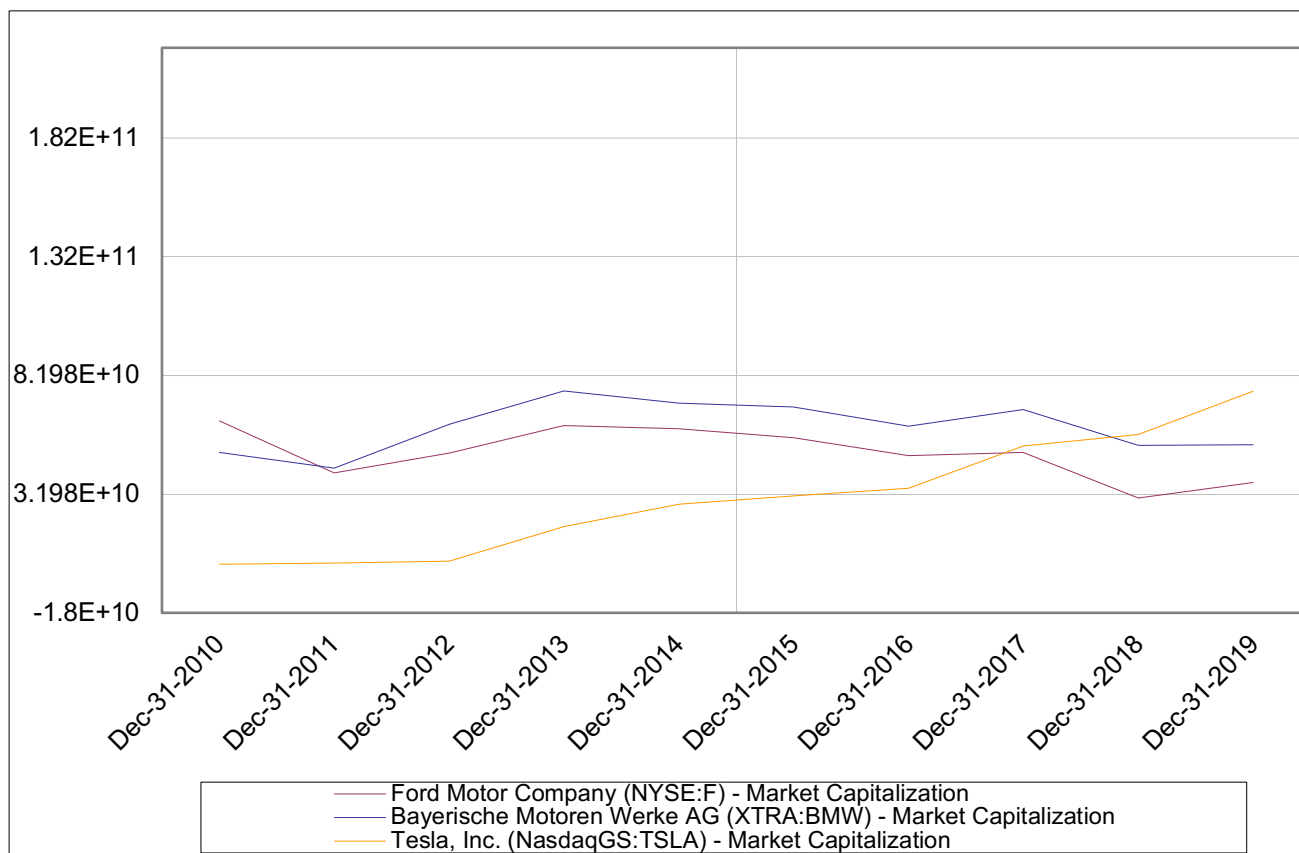
As is illustrated in Figure 2, Tesla's Gross Profit has also been severely that of two of its primary competitors. Table 3 illustrates this in a slightly different way:

Table 3: Tesla vs. Ford and BMW- Gross Profits (USD)

Dates	Tesla, Inc.	BMW	Ford Motor Co.
FY2010	30.73mm	14.64b	17.91b
FY2011	61.60mm	17.98b	17.25b
FY2012	30.07mm	19.08b	15.70b
FY2013	456.26mm	19.71b	15.81b
FY2014	881.67mm	19.25b	14.06b
FY2015	923.50mm	18.32b	18.55b
FY2016	1599.26mm	18.23b	16.78b
FY2017	2222.49mm	22.06b	16.58b
FY2018	4042.02mm	19.57b	14.84b
FY2019	4069.00mm	18.71b	12.88b

As is shown above, Tesla's Gross Profit has dramatically lagged that of its competitors by several orders of magnitude (for example, at the end of FY 2019, its Gross Profit was a little over \$4 billion, while that of Ford was nearly \$13 billion and that of BMW almost \$19 billion).

Next, let us examine market capitalization. This is the total value of stock outstanding multiplied by its price. This metric is used to gain overall insight into the financial size and strength of a corporation.

Figure 3: Tesla vs. BMW and Ford: Market Capitalization

As Figure 3 illustrates, despite all of the preceding figures and tables illustrating how Tesla has lagged behind two of its primary competitors in many major stock metrics, the company's market capitalization has surpassed that of the other two and is now over twice that of Ford and nearly 50% more than that of BMW. Table 4 below presents this information in a different format.

Table 4: Tesla vs. Ford and BMW- Market Capitalization (USD)

Dates	Tesla	BMW	Ford
Dec-31-2010	2.52b	49.72b	62.91b
Dec-31-2011	2.98b	43.00b	40.89b
Dec-31-2012	3.85b	61.48b	49.37b
Dec-31-2013	18.44b	75.52b	60.86b
Dec-31-2014	27.89b	70.25b	59.65b
Dec-31-2015	31.43b	68.73b	55.92b
Dec-31-2016	34.42b	60.61b	48.20b
Dec-31-2017	52.33b	67.71b	49.61b
Dec-31-2018	57.15b	52.67b	30.43b
Dec-31-2019	75.40b	52.85b	36.87b

The remarkable market capitalization of Tesla paints a different version of Tesla's financial prospects. Since investors tend to be optimistic by nature, but perhaps more importantly for our analysis, easily fall prey to such behavioral fallacies as herd behavior, it perhaps is reflective of the extreme positivity and buoyancy surrounding the company, its stock, and Elon Musk himself.

4. Interpretation and Discussion

As the preceding graphs and figures illustrate, Tesla has trailed two of its automotive manufacturing peers in key metrics not only since its inception, but perhaps most importantly, for the last few years during which Tesla could have been viewed as a mature company. However, despite this lagging, its stock price has done exceedingly well and has been a "darling" of Wall Street. Moreover, this stock price increase has dramatically continued into 2020, with its stock price reaching \$1400 per share. Taken from this perspective, it's clear that other factors are at work. What is it that has continued to propel Tesla's stock price upward, despite the fact very little profit has ever been made? While a case could certainly be made that the market is "forward looking" and is taking into account Tesla's future prospects and growth, perhaps a stronger case could be made that something else is afoot, such as investors following a pattern of "herd behavior". In other words, investors continue to invest in the stock of Tesla simply because other investors are doing the same. This is all done in the face of mostly negative profits from the company's inception to today.

The other factor that continues to play a role is the "larger than life" personality of the company's CEO and charismatic leader, Elon Musk. Through the cult of personality that he has created over the last decade or more, along with his savvy use of social media, Tesla's investors along with Wall Street in general has continued to believe that the company and its vision will change the world for the better, and that its stock price should reflect that.

5. Conclusion

Throughout this paper, it has been shown that there has frequently existed a fundamental disconnect between the stock price of Tesla and the company's financial performance. Although the company is undoubtedly innovative and has as its CEO one of the most visionary business leaders of the modern age, its stock price has increasingly outshined its economic fundamentals. In this paper, we have explored Tesla's background from its inception to the current day, the impact of newer forms of communication such as social media, and also such economic concepts as Herd Theory in an effort to give a broad overall of the company's rise to being one of the megastars of Wall Street over the last few years. We have also looked at the financial data of not only Tesla but of two of its primary competitors to gain more of an insight into what has driven the company's stock price over the last decade. While the company has overcome many great challenges over the last 10 or so years and is now the preeminent manufacturer of electric vehicles, it is our conclusion that perhaps the company's economic fundamentals do not warrant such an exorbitant stock price and that other factors may be at work.

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