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Financial Analysis Paper

The Path from Tesla Motors to Tesla Inc.
--A Financial Analysis on Tesla

I. Background Introduction

As one of the well-known and popular companies in the twenty-first century, Tesla Motors was founded in 2003 with the idea to create effective electric cars and sell them to the public. Although Elon Musk has "long been the face of Tesla"[1], he had not joined the company until 2004 when he saw the investment as an opportunity for the new decade.

However, Tesla did not introduce any products until five years later, in 2008, its first car—Roadster—was released. With Roadster, Tesla opened a new era and achieved something that no companies ever had. To settle the problems including long charging time and costly product cost, Tesla released its new Model S in 2012, which was a critical triumph and successfully brought the company to the mainstream of the industry. Then Tesla also opened its freestanding charging stations in the United States as well as Europe. Following the expansion of its ambition, Tesla progressively released Model X, and Model 3 Sedan. In 2015, Tesla announced a new line of solar energy products designed to power homes and businesses. In 2017, Tesla changed its name from "Tesla Motors" to "Tesla Inc."[2].

As Tesla continues to "bloom", its financial statements and capital structure have long been a cause of concern for many analysts and investors over the last decade. Any yet, under Elon Musk's idiosyncratic leadership, the future cashflow still not reflect a stock price that high. In

[1] https://www.thestreet.com/technology/history-of-tesla-15088992
[2] https://www.britannica.com/topic/Tesla-Motors

this paper, a detailed analysis of its financial ratios, DuPont Analysis, investments, industry as well as key risks and considerations will be done to better analyze the financial condition and facts of the company.

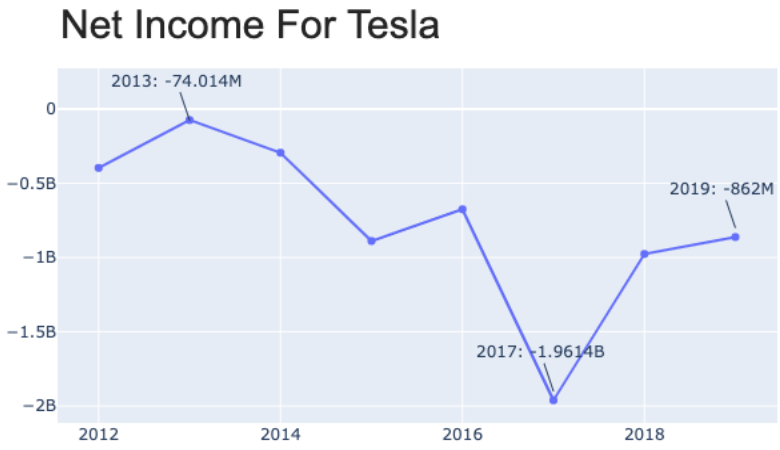
II. Financial Statements and Financial Ratios

Tesla financial statements[3] from 2012 to 2019 were explored and both the short-term and the long-term ratios are calculated for the analysis. The year 2012 is chosen to be the starting year since it could be considered as an evolving year for Tesla due to the fact that the company released model S. At first glance on its income statement, Tesla's total revenue increased from 413,256K in 2012 to 24,578,000K by the end of the year 2019. As the company progressively released model S, model X and model 3, as well as its other production lines between 2012 and 2019, Tesla's total revenue increased by more than 58 times during the 8-year time period ((24,578,000k-413,256k)/413,256k = 58.47) (Plot 1).

Plot 1: Revenue for Tesla from 2012 to 2019

[3] https://ir.tesla.com/static-files/07bfcb70-aba1-4a27-af09-4f101678320c

Surprisingly, throughout the 8 years the company's the net income has never gone positive. Based on historical information, the first peaks in Tesla's net income was -55,740K in 2009, soon after the company announced the attempt to bring down its cost of production. However, this attempt still did not manage to bring their net income above zero[4]. Then, as shown in the income statement, after several years of decline, Tesla reached its second peak in 2013 with a net income of -74,014K, which could be associated with its release and pre-sale of the new model S. By the end of year 2019, Tesla had a net income of -862,000K, meaning that its earnings per share is as well negative (Plot 2).



Plot 2: Net Income for Tesla

In order to better analyze the performance of Tesla, its financial positions were compared with another company of the same industry—General Motors Company[5] in the same period of time. At first, General Motors has total revenue of 137,237,000K at the end of 2019 and its net income has always been positive except in the year 2017 comparing to Tesla's steady negative.

[4] https://finance.yahoo.com/quote/TSLA/financials?p=TSLA
[5] https://www.sec.gov/Archives/edgar/data/1467858/000146785819000033/gm201810k.htm

Tesla Common-Size Balance Sheet, 2017-2019			
	December 31, 2019	December 31, 2018	December 31, 2017
Current Assets	35%	28%	23%
Current Liabilities	31%	34%	27%
Inventory	10%	10%	8%
Cash	18%	12%	12%
Total Assets	100%	100%	100%
Total Equity	19%	17%	15%
Total Debt	78%	81%	82%

General Motors Common-Size Balance Sheet, 2017-2019			
	December 31, 2019	December 31, 2018	December 31, 2017
Current Assets	33%	33%	32%
Current Liabilities	37%	36%	36%
Inventory	5%	4%	5%
Cash	10%	12%	11%
Total Assets	100%	100%	100%
Total Equity	18%	17%	16%
Total Debt	80%	81%	83%

Table 1: Common-Size Balance Sheet 2017-2019 Tesla (Top), General Motors (Bottom)

Considering the size difference in the two companies, common-size balance sheets were derived for a better comparison. Between 2017 and 2019, both General Motors and Tesla have similar proportion in current assets, total debt and total equity. General Motors maintains around half percentage of inventories comparing to Tesla.

Also, General Motors has larger entries in both its balance sheets and income statements than Tesla, meaning that Tesla's financial ratios are more sensitive to fluctuations in numbers in the financial statements comparatively. First of all, the short-term solvency ratios of the two companies are computed to compare their liquidity measures.

	year	current ratio	quick ratio	cash ratio
0	2019	0.883246	0.760780	0.224592
1	2018	0.915561	0.796199	0.253463
2	2017	0.894056	0.755378	0.201743
3	2016	0.894601	0.732734	0.152147
4	2015	1.091526	0.898931	0.213220
5	2014	1.273497	1.065859	0.288489
6	2013	1.305855	1.080914	0.320788
7	2012	1.296414	1.023892	0.341199

	year	current ratio	quick ratio	cash ratio
0	2019	1.134621	0.801631	0.587607
1	2018	0.831285	0.519695	0.368852
2	2017	0.856131	0.561195	0.438835
3	2016	1.074273	0.719468	0.582326
4	2015	0.991227	0.537494	0.424997
5	2014	1.517990	1.065403	0.904396
6	2013	1.875021	1.370911	1.252872
7	2012	0.973401	0.475348	0.374489

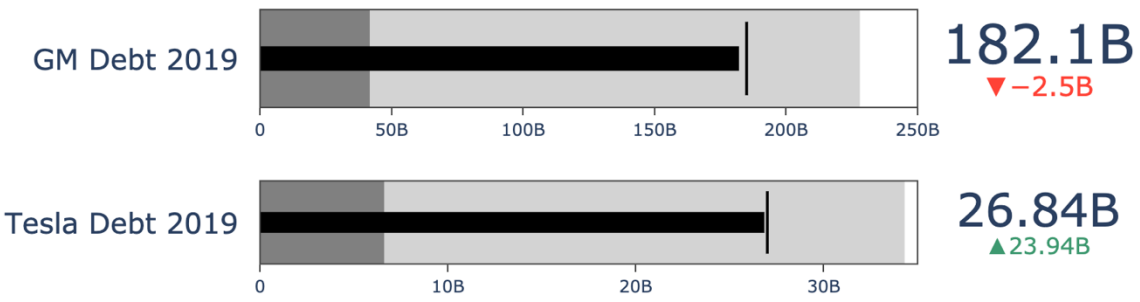
Table 2: Short-Term Solvency Ratios of Tesla Inc. (TSLA) (Right) and General Motors Company (GM) (Left)

Overall, the current ratios (Table 2) of the two companies are similar. However, in 2013, Tesla has a current ratio of 1.88 while General Motors's current ratio is only 1.31. In the recent two years (2018 and 2019), Tesla has a current ratio around 1 and General Motors's is around 0.9. This means that Tesla has $1 in its current assets for every $1 in its current liabilities, and General Motors has its current liabilities covered 0.9 times over.

The quick ratio (Table 2) of General Motors in 2019 is a little lower than that of Tesla, while in both 2018 and 2017 General Motors' quick ratios are higher than that of Tesla by about 0.2. This is an indication of the fact that in the years 2017 and 2018, Tesla's inventory accounted for a larger percentage of its current assets comparing to General Motors, and the situation was reversed in the year of 2019.

Finally, the cash ratios (Table 2) of the two companies were compared. As shown in the table, Tesla's cash ratios were much higher than those of General Motors in the recent 5 years (2015 – 2019). This indicates that Tesla has about $0.2 more in cash for every $1 in its current liabilities

comparing to General Motors in the recent 5 years. Also, this fact could be an indication that General Motors were investing more on assets that might eventually lead to high returns. Furthermore, the long-term solvency ratios were taken into consideration in order to address the long-run ability of the two firms to meet their financial leverages. The total debt ratios (Table 3) for Tesla and General Motors are similar in the recent 5 years (2015-2019). More specifically, they are almost the same in 2018 and 2019, with Tesla's 0.81 and 0.83 and General Motors' 0.82 and 0.83 respectively (Plot 3).



Plot 3: Total Debt of Tesla and General Motors in 2019

These ratios suggest that both Tesla and General Motors are using 81-83% of debt to their total assets, and whether these considerably high debt ratios might make differences would depend on the capital structure matters of the two companies.

	year	total debt ratio	debt-equity ratio	equity multiplier
0	2019	0.816731	4.356815	5.456475
1	2018	0.829066	4.749408	5.850206
2	2017	0.835275	5.036485	6.070741
3	2016	0.802264	4.051807	5.057259
4	2015	0.795029	3.867397	4.878734
5	2014	0.800441	3.995064	5.011056
6	2013	0.743862	2.890840	3.904147
7	2012	0.757439	3.101810	4.122669
8	2011	0.736382	2.770514	3.793363
9	2010	0.739521	2.812023	3.839082
10	2009	0.844096	5.380865	6.414184
11	2008	1.939817	-2.058380	-1.064037

	year	total debt ratio	debt-equity ratio	equity multiplier
0	2019	0.807106	4.055908	5.184195
1	2018	0.834455	4.871174	6.040655
2	2017	0.852131	5.527365	6.762741
3	2016	0.790289	3.603263	4.768462
4	2015	0.865437	6.431475	7.431475
5	2014	0.844132	5.415692	6.415692
6	2013	0.723980	2.622931	3.622931
7	2012	0.888080	7.934964	8.934964
8	2011	0.685969	2.184396	3.184396
9	2010	0.463720	0.864698	1.864698
10	2009	2.943837	-1.514446	-0.514446
11	2008	4.863015	-1.258865	-0.258865
12	2007	4.382783	-1.295615	-0.295615

Table 3: Long-term Solvency Ratios of Tesla Inc. (TSLA) (Right) and General Motors Company (GM) (Left)

The equity multiplier (Table 3) of Tesla was higher than that of General Motors by 0.2 in 2018, but General Motors' equity multiplier exceeds Teslas' by almost 0.3 in 2019. Therefore, considering the changes, the stability of financial leverage of these two companies in recent two years could not be decided.

III. **DuPont Ratios, Investment and Industry Analysis**

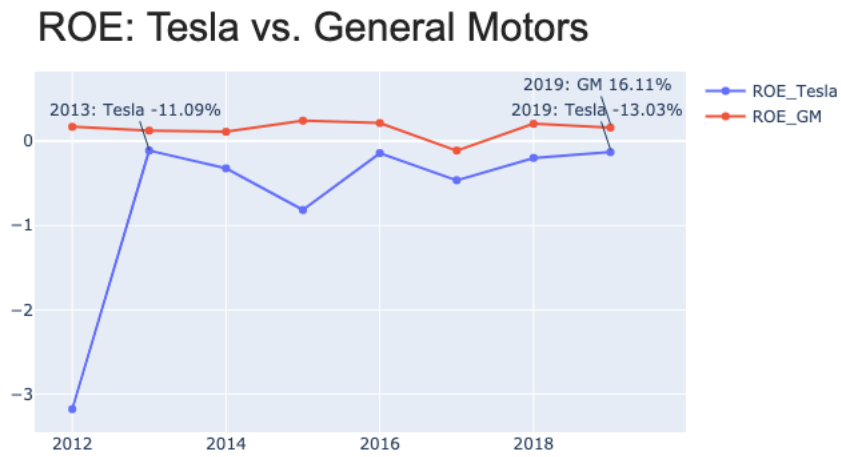
	year	profit margin	EBITDA margin	ROA	ROE
0	2019	0.049054	0.162755	0.029522	0.161083
1	2018	0.054499	0.155547	0.035251	0.206227
2	2017	-0.026541	0.169650	-0.018185	-0.110397
3	2016	0.056659	0.136218	0.042523	0.215052
4	2015	0.063581	0.106186	0.049800	0.242959
5	2014	0.025326	0.076233	0.022226	0.111374
6	2013	0.034396	0.101868	0.032138	0.125472
7	2012	0.040642	0.059072	0.041413	0.170732

	year	profit margin	EBITDA margin	ROA	ROE
0	2019	-0.035072	0.088453	-0.025125	-0.130251
1	2018	-0.045482	0.072660	-0.032821	-0.198262
2	2017	-0.166803	-0.008655	-0.068448	-0.462895
3	2016	-0.096414	0.057079	-0.029779	-0.142000
4	2015	-0.219639	-0.082595	-0.109814	-0.816078
5	2014	-0.091935	0.015064	-0.050270	-0.322515
6	2013	-0.036759	0.033569	-0.030623	-0.110946
7	2012	-0.958759	-0.888065	-0.355606	-3.177330

Table 4: Profitability Measures of Tesla Inc. (TSLA) (Left) and General Motors Company (GM) (Right)

Next, the profitability measures of Tesla and General Motors were further investigated in order to decide how efficiently the two firms use their assets and manage their operations. The measure of profit margin (Table 4) explains how much a company, in an accounting sense, generates in net income for every dollar it has in sales. Since Tesla has long been operating on negative net income, its profit margin was also negative (2012-2019), while General Motors had

positive profit margins except for the year 2017. These ratios could further indicate that Tesla had been generating negative net income for every dollar it has in sales.



Plot 4: ROE: Tesla vs. General Motors

The return on assets (ROA) and return on equity (ROE) (Table 4) measures the profit per dollar of asset and how the stockholders fared during the year respectively. Again, for Tesla, both ROAs and ROEs are below zero in the recent five years (2015-2019) while General Motors' are positive except in the year 2017, which indicates that General Motors have much higher asset utilization comparing to Tesla. Clearly the low ROA and ROE would be problems that Tesla needs to confront eventually (Plot 4).

IV. Risk Measures (Beta) and other Considerations

After a detailed analysis on different financial ratios of Tesla, the next question to posed intuitively is how should investors assess risk if they want to make an investment in Tesla's stock? As defined in finance, beta is used to measure the risk using the given formula.

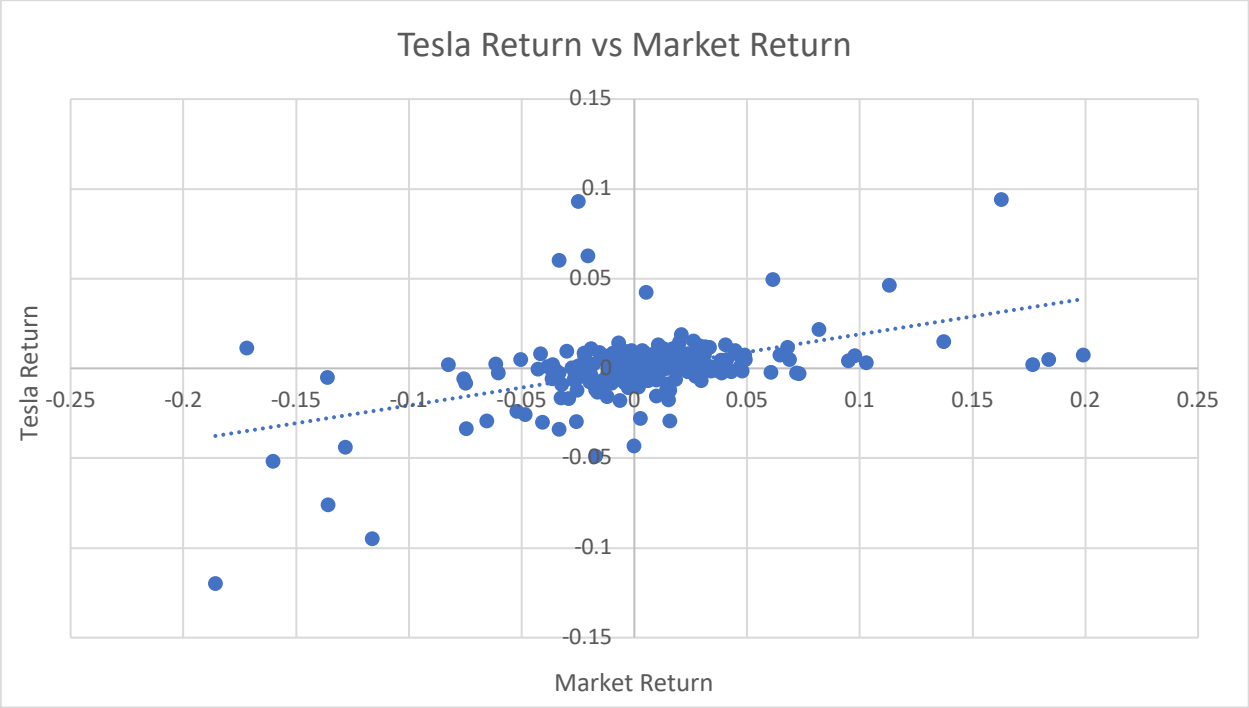
$$\bar{R}_{Tesla} = R_F + \beta_{Tesla} * (\bar{R}_{Market} - R_F)$$

Where $\bar{R}_{Tesla}$ is the expected return of Tesla, R_F is the risk-free risk, $\bar{R}_{Market}$ is the expected return on market, and $\bar{R}_{Market} - R_F$ is the market risk premium.

In order to better analyzed the performance of Tesla in relation to the overall market, the beta analysis for the firm from March 2019 to March 2020 is carried out in this section. In addition, the S&P 500 Index data are used to represent the market data.

As shown in the plot, the change in stock prices of Tesla from March 2019 to March 2020 are plotted against the change in stock price of S&P 500 at the same time (Plot 4). During this period of time, the beta for Tesla is estimated to be around 1.18, which is higher than 1. More specifically, this means that Tesla's stock moves slightly higher that the market. Furthermore, for a more specific analysis, the stock prices for General Motors Company in the same time period were taken and the beta for general motors was calculated in the same manner.

Variance	0.000348601
Covariance	0.000409894
Beta	**1.175824642**

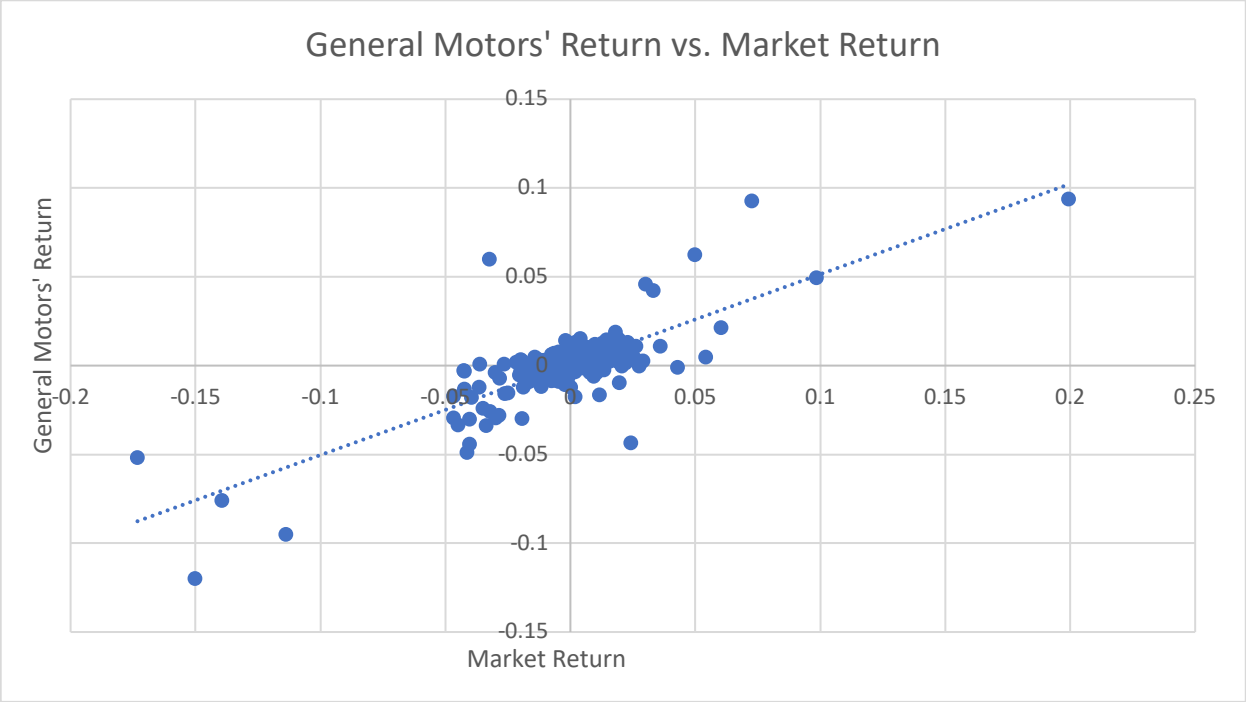


Plot 5: Tesla's Return vs. Market Return (S&P 500)

As shown above (Plot 6), the beta for General Motors is approximately 1.23 during the time period March 2017 – March 2020. The beta for General Motors is slightly higher than that of

Tesla (by about 0.05). An obvious fact is that both the beta for General Motors and Tesla is larger than 1, meaning from the result, it could be inferred that the automobile industry moves higher than the market.

Variance	0.000348601
Covariance	0.000428516
Beta	**1.229245775**



Plot 6: General Motors' Return vs. Market Return (S&P 500)

In detail, the results in understandable since people generally buy cars when the market is stable and there is nothing catastrophic going on such as the COVID-19 pandemic.

V. Conclusion

Although Tesla's success in producing quality electric vehicles in widely known, its the financials and capital structure still cause concerns. Based on the analysis above, it is obvious that Tesla was not generating the sufficient revenues needed to sustain a positive net income by the end of 2019. Taking into consideration the high equity multiplier numbers of Tesla, it could be inferred that that the company is fueling its operations and expansion in the automobile industry by increasingly leveraging debt.

Furthermore, its low return on equity rates also suggest that the company is not performing well to its shareholders. On the other hand, General Motors, was able to maintain positive ROAs and ROEs in the past two years (2018 and 2019), which indicates that the firm is performing better in asset utilization and attribution to its shareholders. Also, its lower cash ratio in recent years could suggest that the company is investing in new projects, for example developing electric vehicles, that would eventually bring in greater wealth.

In addition, processing a beta of 1.18 (Between March 2019 and March 2020), Tesla's stock is expected to either increase by more than the market in up markets or decrease by more than the market in down markets. For investors looking to make investments in a company with solid financial, Tesla is not the one to choose. The company experiencing negative cash flow and could only fund its operations by debt increases. The capital structure for Tesla is troublesome for investors and the company has to be able to grow its revenue significantly as well as increase its ROA, ROE and profit margin in order to bring confidence to its shareholders. Under the assumption that other automobile companies would eventually compete with Tesla in all-electric vehicles and accessory products, Tesla's future is still in question.