CATÓLICA LISBON
BUSINESS & ECONOMICS

Tesla, Inc.

Driving into the Future

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Abstract

This dissertation aims to value the intrinsic share price of the electric vehicles and batteries manufacturer Tesla, Inc. The objective is to recommend a buyer or seller position when compared to the current market price. To reach this value, several assumptions must be taken and different ideas and models should be considered. Analysing the current and past literature regarding equity valuation leads to conclude that there is no consensus among authors about the optimal valuation method. Therefore, the Discounted Cash Flow (DCF) model is considered the best model to value the company. The analysis is also complemented by a relative valuation, which confirms the results obtained in the DCF model.

This dissertation result is a $322,58 value per share which, when compared to the actual trading value on October 14 i.e. $196,51, leads to a buy recommendation. A comparison with a Robert W. Baird's report that reaches the valuation of $338 per share is also conducted.

Abstrato

Esta dissertação visa valorizar o preço intrínseco das ações do fabricante de veículos e baterias elétricas Tesla, Inc. O objetivo é recomendar uma posição de comprador ou vendedor quando comparado ao preço de mercado atual. Para atingir esse valor, várias suposições devem ser tomadas e diferentes ideias e modelos devem ser considerados. Ao analisar a literatura atual e passada sobre a avaliação patrimonial leva a concluir que não há consenso entre os autores sobre o método de avaliação ótimo. Portanto, o modelo de Fluxo de Caixa Descontado (DCF) é considerado o melhor modelo para valorizar a empresa. A análise também é complementada por uma avaliação relativa, que confirma os resultados obtidos no modelo DCF.

O preço atingido nesta dissertação resulta num valor de $ 322,58 por ação que, quando comparado com o valor de negociação real em 14 de outubro, ou seja, $ 196,51, leva a uma recomendação de compra. É também realizada uma comparação com um relatório da Robert W. Baird que alcança a avaliação de $ 338.

Acknowledgements

As the last step on my Master degree, this dissertation has been of utmost importance to me. It offered me a unique opportunity to deepen my knowledge about Equity Valuation, which I believe will be the key subject of my professional career.

Now I would like to thank Professor José Carlos Tudela Martins for all his guidance and support. From the enlightening directions and perspectives shared in the initial seminar up to his permanent availability and promptness in providing comments and responding questions.

It is also fair would also like to thank my colleagues for the discussions, and the useful inputs and suggestions for improvement. Finally, I want to thank my parents for making all this possible to me, and to other family members and friends, who have been always available to support and motivate me to succeed reaching such an important stage in my life.

Executive Summary

Tesla, Inc. is one of the most innovative and disruptive companies in the world, focusing on the production, storage and consumption of electric energy. As a manufacturer of premium electric vehicles and the respective batteries, it has more recently made substantial progress in the field of solar panel technology and shows a potential as a leader of the industry.

The growth of automotive companies is highly correlated to certain macroeconomic factors, such as the economic development, the oil prices and, in the case of Tesla, the high cost of electric batteries. The latter represents a handicap vis-a-vis competitors and hampers the possibility of becoming a mass-market player. There are also other factors that are within the company's control. A successful implementation of their short-term projects and objectives as well as the expansion of production, stores and infrastructures, combined with an improved product quality, allow to project an exponential, although volatile, growth for Tesla. The implementation of upcoming projects is vital to guarantee that the company will thrive in a competitive and capital-intensive industry as the Automotive one as other companies rapidly start to develop fully electric vehicles, Tesla will have to keep up with the expectations. The full capacity production of 500.000 should be accomplished by 2018, which requires the construction of the Gigafactory 2 and the subsequent reduction in the cost of the electric batteries.

Based on the estimated value of $322.58, the market price is low, which is supported by industry multiples. This estimation is higher than the current market value, indicating that most of the future profit potential is yet to be priced in by the market, leading to a Buy recommendation.

Recommendation: BUY

Tesla, Inc.

Date: 14th October 2016

Price: $196.52

Target Price: $322.58

Robert W. Baird Price: $338

 # Shares: 156,10 million

Credit Rating

Standard & Poor's: B-

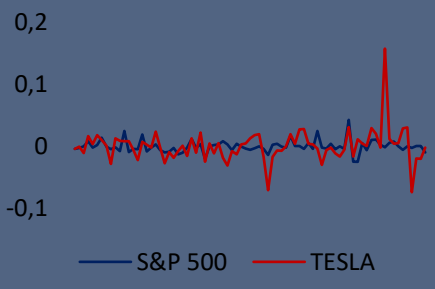
Performance

Financials	E2017	E2018	E2019
Revenues Growth			
Gross Profit	25%	30%	31%
EBIT Margin	1%	11%	15%

Multiples	Ratio	Price
EV/EBITDA	9,59	76,14
Forward EV/EBITDA	7,81	213,69

DCF		
Equity Value (k)	$	50 354
WACC		8,50%
Shares outstanding (k)		156 100
Share Price, USD	$	322,58

Stock Price historical performance 2010-2016



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1. Introduction

The concept of value is unquestionable as a relevant management technique and it is gaining a crucial relevance in this dimension. Valuation personifies the definition of the economic value of a company or an asset. The purpose of this dissertation is to assess the fairness of the current market price based on an analysis of fundamentals as well as the current and expected financial statements of the company. At the end, the present dissertation is benchmarked against an independent valuation.

The motivation behind choosing Tesla as the company to be researched lies on the belief that their appealing products and cutting-edge technology stand as main drivers for the evolution of the consumers' minds towards sustainable and renewable energies. The future for a company like Tesla looks promising due to the growing concerns about global warming and sustainability. Their focus on electric vehicles, rather than conventional carbon-dioxide powered vehicles, and their expansion to the production of electric energy, with the development of their solar panels, is driving the company, as well as many other market players, to a completely new era. Behind all this move, there is an interesting personality, Elon Musk, who manages the company and translates his vision into Tesla's products, not disregarding other very well-known projects like SpaceX, Solar City, PayPal and Zip2.

This study calls for deep knowledge on the different valuation models and techniques, since there is no consensus about an optimal model. Several perspectives are taken with the purpose of supporting the selection of the most effective and reliable model to evaluate this company.

The company's competitive context takes also an important part of the study since it is of utmost importance to profile competitors and understand how their stance impacts the company's way of developing, producing and marketing the products. The analysis of the industry, the competitors as well as the identification of the key risks in terms of likelihood of materialising and potential negative impact, are the basis to sustain the assumptions made, so they may be considered meaningful and accurate when confronted with real market conditions.

In short, the following question could be raised to shortly describe the aim of the study: is the market correctly perceiving the future growth expectations for this company in the sense of yielding a fair price?

To answer this question, a final value per share is determined and compared to the target value achieved by a Robert W. Baird's analyst. The most relevant differences regarding assumptions made, models used and results achieved are identified and discussed in detail in the following sections.

2. Literature Review

The value of a firm is deemed as crucial for investors and shareholders, as it represents the conceptual basis when making investment and financing decisions (Damodaran, 2006).

According to Young *et al*. (1999), the new methods and theories that are constantly being developed affect valuations, in the sense that the crescent number of approaches used to assess a company's value will give poorer results. This means that the valuation of a company is not a forthright subject. Demirakos, Strong & Walker (2004) conclude that for different industry contexts one should apply different valuation methodologies. Luehrman (1997a) states that valuation and assumptions should be based on risk, timing and cash. This means that the same approach can lead to particularly different results, depending on the assumptions made, giving much more relevance to the latter than to the valuation model itself.

Damodaran (2002 & 2006) states four general approaches on how to perform an equity valuation of a company: Discounted Cash Flows model, Relative Valuation, Contingent Claim valuation and Liquidation and Accounting valuation. As Tesla is a company operating under highly unusual circumstances, the two latter models are not adequate, therefore are not part of this analysis (Petersen & Plenborg, 2012).

In the following section, the different valuation methods and their limitations will be assessed to determine which of them will be more appropriate to correctly evaluate Tesla's equity.

2.1. The Cost of Capital

To asses a company's value, it is necessary to evaluate the risk inherent to the cost of funds used for financing a business. This will be a representation of the rate used to discount the forecasted cash flows into present values. On the one hand, it will represent the required return by investors that finances the company through equity, and on the other hand by investors that grant debt funding.

The cost of capital will, therefore, be a weighted average (WACC) of both financing alternatives. The average of the expected returns of different investors, such as equity, debt and hybrid securities investors, weighed by its respective portion in the capital structure at market values (V) will be:

$$WACC = k_e \times \frac{E}{V} + k_d \times (1 - t_m) \times \frac{D}{V}$$

Using the target weights to combine the equity cost of capital and the cost of debt after taxes into a single number (WACC) will allow to discount the projected free cash flows to the firm into their present values. In the case of hybrid securities, Damodaran (2012) and Koller *et al*.

(2010) suggest that they are broken down into their respective straight bond (debt) component and the convertible option (equity). Regarding the capital structure, it is expected to approach its peer groups as the company grows and its straight debt becomes cheaper (Koller *et al*., 2010).

2.1.1. Cost of Equity

The return required by the Shareholders when investing in a company's equity, in exchange for owning the asset and bearing the risk of ownership, is the cost of equity. Damodaran (2001) determines this cost through one of the most fundamental models in finance, the Capital Asset Pricing Model (CAPM). The CAPM suggests a linear relationship between the expected rate of return and the systematic risk of a portfolio, a combination of risky assets to minimize the risk for a given return. This way, the CAPM assumes that investors are compensated by two alternative ways, the time value of money and the risk incurred in the investment.

$$E(r_e) = r_f + \beta_e \times \left[E(r_m) - r_f \right]$$

Where:

$E(r_e)$ = *Expected cost of equity*

r_f = *Risk-free rate*

β_e = *Systematic risk on equity*

$E(r_m)$ = *Expected rate of return on market portfolio*

The cost of equity can also be forecasted using alternative methods and formulas. Fama and French (1992, 1993, 1996) find an alternative to forecast a larger proportion of the variance in returns than just the market's systematic risk (CAPM). Their three-factor model describes that the expected returns can be determined based on the beta as a measure of systematic risk (CAPM's only factor), market capitalisation (difference in returns of a small and a big diversification portfolio) and book-to-market ratio (difference in returns of high and low book-to-market ratio diversified portfolios).

Finally, the Arbitrage Pricing Theory (APT) developed by Ross (1976) suggests that the expected return on an asset is a linear relationship of several independent factors rather than a single factor of systematic risk.

Regarding the three alternative methods, despite the constraint of using only one factor to explain past results (Damodaran, 2002), the CAPM's simplicity and relevance as a benchmark for asset pricing makes it the most advantageous model for this estimation.

2.1.1.1. Risk-free Rate

The risk-free rate characterises the return on a security that investors can expect with certainty, obtained in the market at the time of the valuation (Fernández, 2004). The expected payoff of this asset always equals the actual payoff characterizing the interest an investor would have from a riskless investment over a specified time-period. Government bonds can be considered risk-free assets, due to the low probability of bankruptcy of some of the main economies.

The risk-free rate should reflect the security that an investor in Tesla's shares would have invested in if he was risk averse. As most of Tesla's investors are American (Nasdaq.com), the U.S. Treasury Bond will be used. Although the maturity of the risk-free asset should match the investment horizon for the expected cash flows, Bruner *et al*. (1998) nevertheless argue that the differences between the 30-year and the 10-year rates are not critical.

As Tesla is reporting and forecasting in USD, the 10-year U.S. Treasury Bond provides sufficient consistency for its valuation.

2.1.1.2. Beta

The equity beta is a measure of systematic risk that derives from the relationship between the return of the stock and the return on the market's portfolio. According to Petersen & Plenborg (2012), beta captures the risk added by a single security to a broad and diversified portfolio. Consequently, market movements will have positive or negative impacts on the stocks, depending on whether the beta is greater or lower than one, respectively. This means that the stock will react to market changes in proportion to the beta. When the beta is zero, the asset is risk-free. The raw equity beta is estimated by regressing the company's daily returns on the daily returns of a market index:

$$\beta = \frac{Cov\,(\,r_a\,,\,r_m\,)}{\sigma_m^2}$$

$$r_a = \alpha + \beta\, r_m$$

Where:

r_a = *Stock return*

α = *Regression constant*

β = *Equity beta*

r_m = *Return of the market portfolio*

While the raw beta represents an historical average, some data providers like Bloomberg use an adjustment to account for evidence that the beta tends to regress over time (DeMarzo, 2012). The risk parameters of the firm evolve alongside its life cycle, becoming closer to the average firms of the market as it matures, which according to Damodaran (2012) should be reflected in the beta and, accordingly, in the cost of equity. The formula of the adjusted beta is as follows:

$$adjusted\ \beta = \frac{2}{3} * raw\ \beta + \frac{1}{3}$$

2.1.1.3 Market Risk Premium

The market risk premium represents the average additional return an investor would have from investing in risky assets rather than just investing on a risk-free asset. To calculate this premium, besides the risk-free rate a market portfolio is also needed. This portfolio is characterized by gathering the total supply of securities, weighted by the relative proportion of the total market (Berk and DeMarzo, 2014). Market indices are most commonly used as proxies, due to the constraints and impracticalities of creating a market portfolio.

When calculating the historical risk premium, experts use different period lengths. Some argue that a shorter period is better due to the unpredictability of average risk aversion, and that for certain risk levels recently acquired data better represents current required returns. Others say that a longer time frame makes it possible to reduce the standard error of the risk premium estimate, improving the estimation, as suggested by Damodaran (2012). This author also discusses the use of the arithmetic average rather than the geometric average of the risk premiums. As the projection time is extended, the geometric mean becomes more relevant. In the case of a sample period like the one projected, the geometric mean is the unbiased estimate of the mean. The geometric mean is a more appropriate measure for future predictions, especially when it involves relatively long projection periods.

2.1.2. Cost of Debt

The cost of debt is a required return to fund a company based on its operational and financial risk. It is based on the credit rating assigned to the company, and therefore calculated as the credit spread over the risk-free rate. Since the rate reflects the cost at which the company can borrow today, if an Investment-grade company has long-term option-free bonds, Koller *et al.* (2010) suggests that the Yield to Maturity (YTM) is a good measure for the cost of debt.

Meanwhile Tesla only has short-term convertible bonds outstanding and the yields are highly dependent on stock movements as debt is directly tied to the relative stock conversion. Therefore, it is not possible to use the yield to reach Tesla's actual cost of debt. Instead, the company's credit rating is determined to match a portfolio of long-term bonds with the same rating, extracting the average yield to maturity.

The company's bond rating is determined by rating agencies like S&P, Moody's and Fitch Group. They examine the most recent financial ratios presented by the company, their competitive environment, and interview the senior management. Damodaran (2014) assigns a credit spread for the ratings of different agencies. In this case, the most recent evaluation and spread should be used (Koller *et al*., 2010).

Finally, the cost of debt must be calculated on an after-tax basis, because there is a tax benefit that accrues from paying interest, implicating a lower after-tax cost of debt than the pre-tax cost (Damodaran, 2012). The formula is as follows:

$$k_d = Cost\ of\ Debt \times (1 - t_m)$$

Where:

k_d = *After-tax Cost of Debt*

t_m = *Marginal tax rate*

2.1.3. Forecasted Period

The length of the forecasted period is a rather subjective matter. The forecasting of a company's financial statements is not straightforward and an appropriate time frame for each case should be estimated. To calculate an accurate terminal value, it is important that the forecasted period spans until the company has reached its steady state (Koller et al., 2010). It is also relevant that the period is long enough, so that demand and supply are balanced in the long run, and growth rates are not greater than the actual growth of the economy. So, to meet the existing demand, the company starts off with high growth rates until it reaches the maturity state, where the growth rate will tend to fade towards the growth of the economy.

2.1.4. Terminal Value and Growth Rate

The Terminal Value is considered the most important component of a valuation estimation, since it will always represent a large proportion of the total value, and in some cases it can be

greater than 100 % of the value of the stock (Damodaran, 2002). This reflects the price appreciation that results from the returns gained by holding a stock for a finite period of time.
Damodaran (2012) defines three different methods to estimate the terminal value: Liquidation Value, the Stable Growth Model, and the Multiple Approach.
The first one is based on the value that other companies would be willing to pay for the company's assets at a certain point in time:

$$Expected\ Liquidation\ Value = Book\ Value\ of\ Assets \times (1 + Inflation\ Rate) \times Average\ Life\ of\ Assets$$

This model assumes a finite life for the firm and a liquidation at the end of that period, and it relies on accounting book values.
To calculate the terminal value of the company using the Multiple Approach, a comparison with the company's peer group is made. It represents a hybrid valuation (relative and intrinsic), using companies with similar operations and results.
The most consistent and accurate model that Damodaran (2002) presents is the Stable Growth Model. Since firms can reinvest some of their cash flows back into new assets, they will be extending the lives thereof. The Stable Growth Model assumes that if the cash flows earned beyond the terminal year grow at a constant rate forever, the terminal value will be estimated through the following formula:

$$Terminal\ Value_t = \frac{Cash\ Flow_{t+1}}{k_{t+1} - g_t}$$

In this formula, it is clear to perceive the importance of the Growth Rate (g_t) used to estimate the Terminal Value. As growth increases, so does the proportion of terminal value. To apply this model, the company must be in the steady state, meaning that it will not have very big investments, leaving the capital expenditures (capex) and the depreciations at constant levels in its future life (from *t+1* onwards). It is also assumed that the cost implied in the formula (*WACC* or k_e, and accordingly Free Cash Flow to the Firm and Equity) is greater than the stable growth (g) estimated for the company. In the long run, companies cannot grow faster than the economy, meaning that it is unrealistic to have growth rates greater than the nominal GDP evolution.

2.2. Discounted Cash Flow Models

The Discounted Cash Flow (DCF) models require that the future cash flow projections are discounted to obtain the present value of a firm's assets, at a rate that reflects the riskiness of those cash flows (Damodaran, 2006). The differences between models are in the discount factors to be used and the assumptions made to estimate future cash flows. Dividends, cash flows and accounting earnings are some of the measures used, which in a *ceteris paribus* environment should provide the same outcome. Nevertheless, empirical evidence has varying results, since different estimates of the expected cash flows will result in different market values. This model relies on the forecasts of the expected cash flows, meaning that two different growth stages will have to be considered, adding up to the formula of the terminal value discussed previously.

Damodaran (2002) and Luehrman (1997) argue that this model reflects the best theoretical credentials and is considered as best practise when valuing a company. In this section, the most important valuation methods within the DCF will be assessed, focusing on the more relevant ones for Tesla.

2.2.1. Free Cash Flow to the Firm

This model is meant to assess the business as a whole in order to estimate the value of the firm. The goal of this valuation is to determine the intrinsic value of an asset, based on the analysis of all features of the business. The Free Cash Flow to the Firm (FCFF) is a performance measurement considering the net amount of cash generated, after adjusting it to excess cash, which includes taxes, expenses and variations of yearly investments and working capital. The FCFF formula is as follows:

$$FCFF = EBIT \times (1 - t) + Depreciation - CapEx - \Delta NWC +/- CF_{\text{non-operating activities}}$$

Breaking down the formula, even though depreciations are not a cash expense, it is a cost included in the financial statements, being considered for tax purposes. According to Damodaran (2006), the free cash flow can be achieved by discounting the cash flows created from assets, prior to debt payments and after reinvestments towards the creation of growth assets. The discount rate used in the actualization of cash flows is the WACC, which captures the costs and benefits of the capital structure, as well as the tax shield effect:

$$Firm\ Value = \sum \frac{FCFF_t}{(1 - WACC)^t}$$

2.2.2. Free Cash Flow to the Equity

The firm value approach evaluates the total enterprise value, while the Free Cash Flow to the Equity (FCFE) estimates the value of the firm to equity holders (Young *et al*., 1999). This way, the firm value represents the portion of value that debtholders and shareholders possess, while the equity value only concerns the latter. It represents the cash available to pay all the equity holders after considering debt payments and necessary investment in fixed and working capital:

$$FCFE = Net\ Income - Net\ CapEx - \Delta NWC + New\ Debt - Debt\ Repayment$$

Alternatively, to the previous valuation method, in this case to assess the firm's equity through the equity's cash flows it is necessary to discount it with a cost that reflects the risks related to equity. The FCFE will be discounted back to the present value at the cost of equity, as referred previously.

$$Equity\ Value = \sum \frac{FCFE_t}{(1 - k_e)^t}$$

Both the FCFF and the FCFE have better results depending on the environment and the type of company targeted for investment. For relatively stable capital companies, FCFE is more suitable due to its simplicity, and the FCFF is more effective when valuing leveraged companies with a negative FCFE.

2.2.3. Limitations of the DCF model

Although it is the most used and known valuation model, some limitations might represent a barrier to correctly measure the company's value. The high dependency on future predictions is one of the main problems. Damodaran (2002) believes that the information available in the market is not enough to carry out an effective analysis and, so assumptions should be made. The failure of one of these assumptions will have an impact on the intrinsic value, moving further away from the real value. The discount rates are also referred to as a problematic, since another author (Luehrman, 1997) refers to the usage of the WACC for the computation. This discount factor is adequate for companies with constant capital structures, benefiting from the

simplicity of tax position and funding policy, and biasing the analysis in companies with unstable capital structures. Also related to the cost of capital, Fernandez (2013) refers some errors and misconceptions that influence the quality of the estimation. The WACC is dependent on the valuation of tax shields, which are defined by the company's debt policy and affects the capital structure. This highly unpredictable component of the discount factor makes it more difficult to correctly estimate the true cash flow, as it will have a considerable impact on the company's accounts.

2.3. Relative Valuation

The Relative Valuation does not rely on computing the intrinsic value of the asset, but rather depends on similar assets to determine the value. This valuation can represent an effective way to validate the assumptions made in DCF model by comparing outcomes. Furthermore, Goedhart *et al*. (2005) suggest the combination of the two models, since Relative Valuation is more accurate in forecasting. However, the Relative Valuation by itself does not yield the most precise estimation. There are two critical factors in the assessment of the company's value through comparable companies: The Peer Group and the Multiples.

The Peer Group is a set of companies that have identical characteristics, and different authors propose different ways of aggregating them. Damodaran (2006) defines these characteristics as cash flows, growth potential, and risks to the company being valued. The performance characteristics that seem more important in peer definition are the return on invested capital and growth, raising the quality of the peers when these are similar. Besides these characteristics, peers should be comparable in terms of size, markets, products and customers, which stand as firm specific features.

There is a wide range of Multiples and these can be distinguished depending on whether they are used to derive the Equity or the Firm's value. It is not a straightforward subject, as different situations and environments require different Multiples. The greatest advantage of the Firm value multiples is that they do not depend on the capital structure of the company (Goedhart *et al*., 2005). As these multiples are not based on accounting values, rather on EBIT and EBITDA, they are less prone to manipulation. Nonetheless, the equity multiples, also called earnings multiples, still have better performance than historical data, sales and book-value multiples.

The enterprise multiples are less susceptible to errors or even to manipulation, such as the Enterprise-Value-to-EBITDA. This will be the most relevant ratio to consider in the analysis of Tesla, which will need to be adjusted for excess cash and non-operating assets that are valued

distinctly. A simpler multiple, also based on the Enterprise Value (EV), will be used with Revenues instead of the EBITDA.

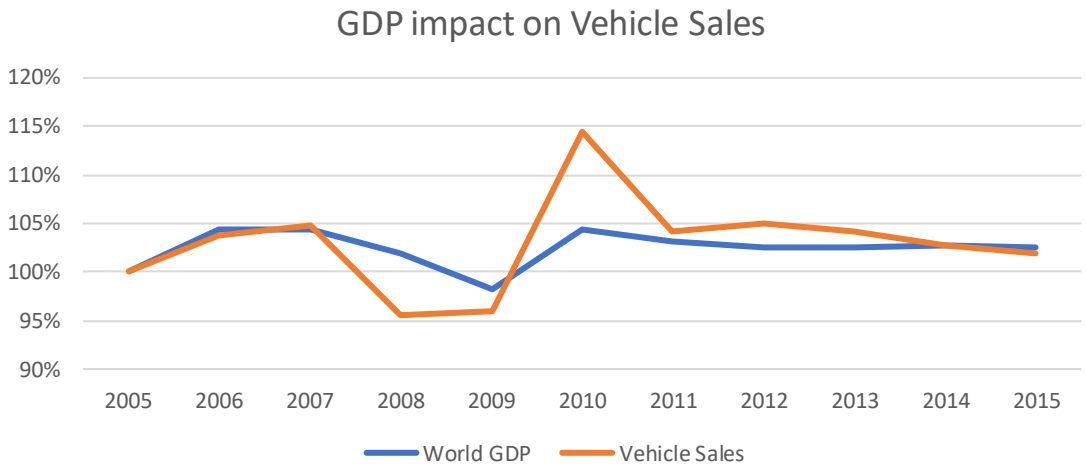
Analysing the equity ratios in detail, the Price-to-Earnings (P/E) ratio is broadly used, even though it has a couple of flaws. The company can artificially increase this multiple by exchanging debt for equity. This happens when the unlevered P/E is higher than one over the cost of debt, and leverage will have an impact on the P/E. Moreover, the multiple can suffer from singular non-operational impacts, as it is based on earnings. Even so, when using forecasted earnings instead of historical ones, the estimation will be more precise. Besides the P/E, the multiple that relates the Price with the Book Value will also be used on a forward-looking basis.

Goedhart *et al*. (2005) concludes that there are some multiples that value companies more effectively than others, as in the case of asset value multiples, which are less biased and more precise than earnings and sales multiples. Additionally, they argue that forecasted rather than historical earnings improve the estimate of the multiples referred.

3. The Automotive Industry

3.1. General Overview

To conduct a proper evaluation of Tesla, Inc. it is crucial to properly analyse the environment in which they are competing and describe the main behaviours, drivers and future trends that need to be considered. These macroeconomic factors are deemed as crucial to define the performance of the global industry. Despite the consumer's perception of the automobiles as a basic need, they are still considered as luxury goods. An illustration of past behaviour compared to the world's economy performance is a good way to consolidate this idea.



Source: Compiled by author/World Bank

The automotive industry has experienced an incredible growth over the past couple of years, assuming a role as one of the main drivers for industrial revolution, especially due to constant innovation seeking to satisfy the demanding customer's needs. It is an extremely competitive and consolidated market, where the top 15 companies control most of the market. Despite having an important weight on today's economy, it has proven to be highly dependent on the performance of the world's economy. According to our own calculations, both these variables have a strong correlation (~0.72), which means that any shift in the global economy will strongly impact vehicle sales, as it did at the time of the 2008 crisis (big drop in sales), and the beginning of its recovery (highest sales registered in 2010).

There are four main markets that dominate global car sales – China, United States, Europe and Japan – over these past years. China has been the largest market since the economic crisis and its lead over the United States has been growing since then. China's growth during the recession was one of the reasons for keeping the industry relatively stable, when compared to the

expectations regarding the financial crisis. Because of the crash in Europe, Tesla redirected its focus to strong European economies such as the UK, Norway, Germany, Switzerland, and the Netherlands.

The main issues to take into consideration for the automotive industry are the growth of public debt in Europe, United States and Japan, and the problem of overcapacity in China. These factors altogether mean that a wider outlook of the economy must be considered, in order to account for possible and significant impacts across the industry.

3.2. The Electric Vehicles Market

To develop a reliable forecast, it is necessary to delve deeper into the most valuable sector for Tesla's business, the Electric Vehicles (EV). Despite being a relatively recent market, some of the companies that commercialize electric cars have successfully shaped their business models to achieve profitability. A significant factor for this development is the constantly growing pressure on manufacturers, such as regulatory standards, towards the reduction of vehicle emissions. Demand in the automotive industry has been shifting towards electricity-powered vehicles, due to these regulatory benefits and technological progress in powertrain components. Efforts have been made in this direction, as in the Electric Vehicles Initiative (EVI) which aims at achieving the number of 20 million EV on the road by 2020. Tesla manufactures and sells a different product from the traditional automotive segment, even though they compete in the same market. This sector is divided into three segments as detailed in Appendix A.

3.3. Government Incentives

As previously mentioned, governments and local authorities have a growing concern on the environmental issues and pressures put by the central institutions and organizations. In this sense, the governments began to legislate on and control some activities and behaviours that are harmful to the environment, and are especially granting benefits to ecological (green) products and services, which has a positive impact on Tesla's sales. This section addresses the assessment of incentives and analyses, aiming to understand how changes in those regulations could impact Tesla's performance. To promote the production of electric and environmentally-friendly vehicles, Tesla has several agreements with the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA). Tesla is exempt from paying taxes on the purchase of manufacturing equipment used in the development of the existing models (Model S, Model X, Model 3), future electric vehicles and expansion of powertrain production

in the state. This agreement has already saved $100 million until the end of 2016 and is estimated to double until the end of the contract. Tesla is also benefiting from tax reductions in the state of Nevada, related to the construction of the new Gigafactory 1. The conditions to receive these advantages rely on the investment of at least $3.5 billion in the factory they are developing in Nevada. Other perks are related to the production and distribution of zero-emission vehicles, which allow Tesla to obtain tradeable regulatory credits. The Environmental Protection Agency (EPA) establishes an average carbon dioxide emissions standard which manufacturers are not permitted to exceed, allowing for the sale of excess credits to other producers who will find them useful to comply with the requirements, such as the ZEV credits and the Greenhouse Gas (GHG) credits. Zhang *et al*. (2014) state that governments are forced to make economical efforts to convince the consumers that Electric Vehicles also have financial benefits, which is an impact the consumer will perceive immediately, contrary to the environmentally-friendly idea. Having this in mind, the U.S. Department of Energy made available income tax credits up to $7,500 for Electric and Plug-in Hybrid Vehicles buyers, which means receiving the full amount if they purchase a Tesla. The most common form of State incentives are rebates from $1,000 up to $2,500 and access to carpool lanes (Appendix C). A slight reduction in these benefits would have a strong negative impact on demand, mainly in the U.S., their biggest market with about half of their sales. Considering eventual changes in these incentives, these will have a significant impact on the company's intrinsic value and should be measured in the valuation.

4. Competitive Analysis

4.1. Current Competitors

To assess and analyse Tesla's competitive environment, it is necessary to understand what the alternatives to their vehicles are now and in the future. The alternative fuel vehicles market is highly competitive, taking a leap with the introduction of lower priced vehicles, such as the Model 3 (Annual Report 2016). Their current Models S and X compete in the premium sedan and SUV market with Audi, BMW, Mercedes and Lexus, while the upcoming Model 3 is meant to compete with medium-sized sedans from the same brands and also Honda and Toyota. The first four brands are strongly featured in January 2016's top selling list of hybrid and plug-in hybrid vehicles. These brands might also be somehow projected by their traditional fuel engines (Appendix D), even though Volkswagen's Chairman (June 2016) has stated that "the future belongs to electric cars". In case competitors launch a new model, and a new fully electric vehicle, it is pertinent to consider the release of electric models in the forecasting exercise.

Porsche plans to reveal their first fully electric sedan by 2020 to compete with Tesla's Model S. Its characteristics will be extremely competitive, such as 40 miles (15%) more autonomy than Model S, and charging up to 80% of the battery in just 15 minutes. Moreover, Porsche states that the price will be "competitive", even though it is not yet available. Lexus is specifically concentrating their production on the hybrid cars segment. It does not seem that the company will develop the fully electric vehicles, since they have applied an advertising strategy that downgrades the electric cars, underlying their charging time and range constraints. Audi's strategy focuses on the development of a contender for Tesla's Model X. Their ambition is to launch a battery powered sports activity vehicle by 2018, the Audi Q6 e-Tron Quattro, with an extremely competitive autonomy range – more than 310 miles – and a price comparable to Model X's (Sheehan 2016). Another novelty expected in the market by 2020 is the fully electric Volkswagen Phaeton. At a price like Audi, it also shares the same battery technology, allowing for an improved autonomy range. Volvo also plans to launch in 2019 a competitor in the electric vehicles market, but to face Model 3. Their strategy is to have the entire Volvo fleet electrically powered by 2020 (Ingram 2015).

Competition will be fierce by 2020, due to the development of fully electric cars by other brands, able to compete with Tesla's leading Models. Nevertheless, Tesla is settled in this segment right from the start, giving them more time to further develop their existing models and to innovate with new ones.

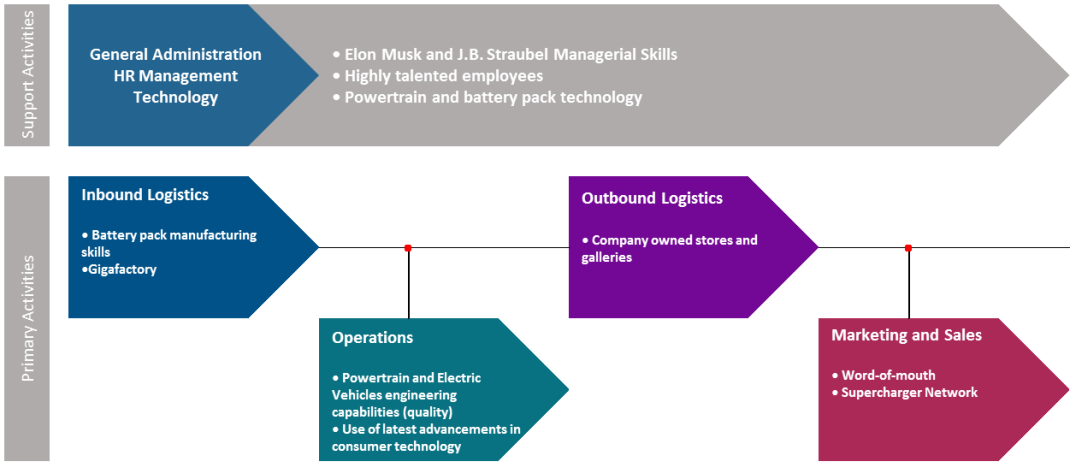
Regarding the Energy Storage products, several established companies could develop and introduce products to compete with Tesla's individual component of energy storage systems and integrated systems. Examples of these companies are AES Energy Storage, LG Chem and Samsung. As for the Solar Energy Systems, the competition is with traditional local utility companies. In the residential solar energy installation market, the companies that compete with Tesla are Vivint Solar Inc., Sunrun Inc., Trinity Solar and Songevity, Inc. (Annual Report 2016).

4.2. New Competitors

Nowadays, in the automotive industry, the Electric Vehicles segment is the most attractive one, with high forecasted growth rates and many government incentives. These characteristics of this market make it prone to having companies willing to invest in electric vehicles and to compete with the already settled brands. The entry barriers for new players in the industry are high, since it is a market where brand strength, reputation and huge initial investment are necessary requirements to be able to thrive. The companies that are more successful when entering this segment are the experienced manufacturers of traditional fuel vehicles or other kinds of alternative powered vehicles. Nevertheless, Tesla should be aware that new competitors might bring some competitive innovations. It is the case of Apple and their 'Project Titan', which Elon Musk, Tesla's CEO, refers to as an "open secret". Regardless of Apple being very discrete about this project, it is known that they have a team of about 1.000 employees, hired from companies like Tesla, Ford and BMW, working on an "Apple-branded electric vehicle" (Leswing, 2016). Google is also entering this market, having already an electric vehicle prototype, despite focusing mainly on software to build self-driving cars. Easily overcoming the high initial investment barrier, Google is racing with Tesla for the first mover advantage of the self-driving car, which is estimated to be launched by the first half of the next decade. In general terms, the risk of having new strong competitors is low to moderate. This risk is assumed by companies already in the automotive industry, at least in the short term. Innovative companies may have an influence in consumer's expectations and needs, having an impact in the longer term.

4.3. Sustainable Competitive Advantage

As previously referred, Tesla is a few years ahead of their competition, allowing for a greater flexibility in their own value chain to maintain their success with high growth rates, and therefore a competitive advantage. Tesla's most value-creating resources can be recognised by a Porter's Value Chain Analysis (1985), as can be seen in the following chart:



Source: Compiled by author

Tesla takes advantage of being one of the few companies in the business to be vertically integrated, including design, manufacturing and sales, to reduce costs and facilitate quality control. Regarding Tesla's Inbound Logistics, all the powertrain is developed in California's factory and the battery packs, which represent a key input, are sourced from Panasonic. Tesla has the possibility of maintaining an advantage in their Operations as construction time and technical know-how will delay competitors for a few years. Based on the analysis, the rest of the Primary activities allows Tesla to keep ahead of the competition temporarily until these are invented or even substituted by the competitors. The relationship that the Support Activities can uphold with the Primary activities adds significant value to Tesla's value chain. Although it is difficult to measure the managerial skills effect on a company, it is noted that Tesla has been following the right strategic path and vision, which allow for performance improvement at any level. Analysing the overall value chain, Tesla's relies on their installed capacity and know-how in product manufacturing, and their managerial skills to maintain its competitive advantage over the rest of the market.

5. Tesla, Inc.

This section introduces the reader to Tesla and highlights some relevant aspects of the company. Tesla, Inc., formerly known as Tesla Motors, Inc., was founded in Palo Alto, California, in 2003 by a group of engineers with the goal of demonstrating that electric cars could perform better than fuel powered ones. Their reputation relies mostly on the characteristics of their vehicles, such as the instant torque, their incredible power and the zero emissions component.

The company's strategy began with the production of a fully electric premium sports car, the Tesla Roadster, evolving to a more affordable alternative such as the Model 3. Nowadays, the company operates in two different segments, the automotive and the energy generation and storage. Their major activity is designing, developing, manufacturing and selling electric vehicles. Based on the fully electric component of the Electric Vehicles segment, the company designs, manufactures, sells and installs fixed energy products and solar systems to all sorts of customers, or sell electricity generated by their solar energy systems. Elon Musk, one of the founders of the company, later became CEO after investing in the company. Tesla became listed on the NASDAQ stock exchange (TSLA.O) after raising USD 226 million through an IPO in June 2010 (second IPO of a US automaker since Ford Motor Co. in 1956). These proceeds were useful to fund their following investments in factories and in the production of the Model S Sedan. The manufacturing and assembly processes are carried out in their various facilities: Fremont, California; Lathrop, California; and Tilburg, Netherlands (Tesla Annual Report 2016). To achieve a mass-market in the electric vehicles sector it is necessary to enhance the production of the lithium-ion batteries. In the automotive sector, Tesla has three different car models, the Model S Luxury Sedan, the Model X sports utility vehicle (SUV) and the lower price Model 3 Sedan designed for the mass market (expected to be available and delivered in 2018). In 2016, Tesla received the highest consumer satisfaction score among all car brands from Consumer Reports website.

Rank	Brand	Would Buy Again
1	Tesla	91%
2	Porsche	84%
3	Audi	77%
4	Subaru	76%
5	Toyota	76%
6	Honda	75%
7	Mazda	74%
8	Chrysler	73%
9	Chevrolet	73%
10	Lexus	73%

Source: Compiled by author/Consumer Reports

Tesla is one of the few vertically integrated companies in the world, and has established a global network of vehicle stores, service centres and supercharger stations that allows the generation, storage and consumption of their energy products (Tesla Annual Report 2016).

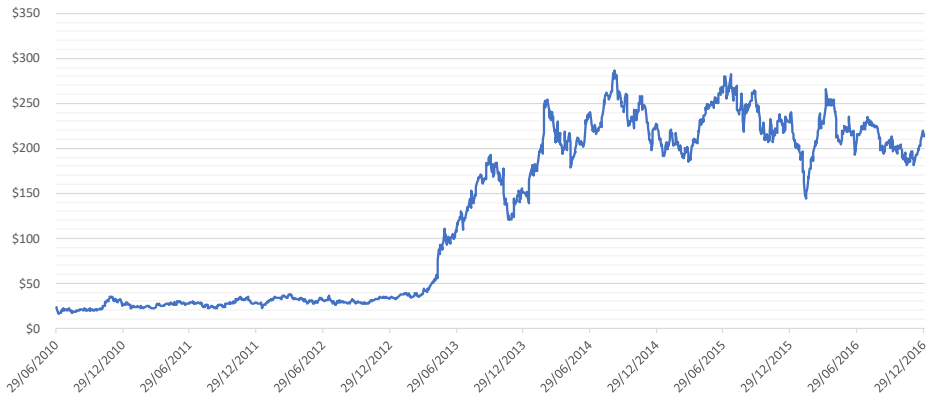
Tesla spotted a niche market right from the very start, showing some of the characteristics of a disruptive company. Tesla differentiates from the traditional players by concentrating on

electric powertrain technology, and as a new entrant, they developed this technology to be sold to a niche market. With the continuous improvement process, they achieved a more cost-efficient technology when compared to others already established in the market.

5.1. Historical Share Price Development

Since Tesla's IPO until June 2016, the shares have been rising at a CAGR of about 44 %. The initial price of the IPO was $17, and its value now stands at $196.51, having reached its peak on September 4, 2014 with a price of $286.04. The greatest increase noted since the IPO was in 2013. This return may be explained by two reasons: good ratings achieved by the Model S quality and the supercharger grid increase; and the outstanding financial results, triggered by early loan repayments and the exceeding of expected results.

Figure 2: Stock Price Development



Source: Compiled by author/NASDAQ

5.2. Strategy

As Tesla's CEO, Elon Musk, states, "Tesla's mission is to accelerate the world's transition to sustainable energy". Tesla positions itself as not only an automaker, but also as a technology and design company that focuses on energy innovation. This transition seems somehow contradictory, since they are especially rooted in the premium vehicles segment which is not affordable by most of the customers. Tesla expects to continue lowering manufacturing costs, due to enhanced efficiency, material cost reductions, and especially economies of scale. The greater development of the vehicles has been particularly in their battery packs, which are designed to achieve high energy density at a low cost, and therefore improving the mileage autonomy of the batteries. That is the case of the new Model 3 that is already announced to start selling in 2017. The new vehicle is targeted for the mass market with a price of $35.000, representing a step forward towards the success of their mission. In 2016, Tesla produced

approximately 84.000 vehicles, an increase of 64% when compared to the previous year's production. The improvement of both Models S and X, aligned with the introduction of a less expensive alternative, the Model 3, and the development of their retail, services, and charging infrastructures will generate incremental demand. The model 3 is the most significant driver for demand, with a mind-blowing 400.000 pre-orders since it was presented in March 2016. As a consequence, in early 2016 the company announced the anticipation to the year 2018 of their initial objective of reaching a production level of 500.000 vehicles by 2020. This production level can only be achieved by the full development of the Gigafactory, for producing the batteries and the storage products for the vehicles. Production levels from 2018 onwards can be raised with additional production capacity in Europe and Asia, possibly with the Gigafactory 2 that is already being planned.

5.2.1. Supercharger Network

Tesla has been seriously investing in the expansion of their Supercharger station network. This system is much more appealing than the alternative of charging at home for some hours, since it is free or requires a small fee, and it only takes a couple of minutes. From the closing of 2015 to 2016, Tesla expanded from 584 to 790 stations, with 4 to 14 Superchargers (Appendix E). Each of these stations is strategically located along the most travelled highways, allowing the drivers to travel with minimum stops. Nonetheless, Tesla will keep developing and expanding their Supercharger grid.

As for the destination chargers, these are in convenience and public sites, such as hotels, resorts and shopping centres. The investment in these chargers is also relevant, having now more than 7,110 wall connectors. The high rate of development of these charging alternatives changes the customer's perception in terms of autonomy concerns, and therefore increases demand. To meet the residential customer's charging needs, the Powerwall 2 was announced and became available in 2016, which includes an integrated inverter for residential applications.

5.2.2. The Gigafactory

The second largest building in the world with a production capacity of battery cells greater than the rest of the world is situated in Nevada and Tesla runs it. It is expected to be fully operational by 2020. For the time being, it produces the battery cells for the energy storage products and will oversee the production of the new Model 3 drive units (Appendix F). The reason for anticipating target production levels by two years, lies on the belief that this factory will drive production exponentially. It is a highly efficient manufacturing facility, allowing for Tesla to

benefit from scale economies and cost reductions up to 30% with the production of Model 3 (Annual Report 2016). The growing demand is taking Tesla to consider a second Gigafactory, forcing competitors to create alternatives, which for now are far from Tesla's. As Vance (2015) refers, the other manufacturers are possibly seven years behind Tesla.

5.3. Ownership Structure

Since the IPO, Tesla has only offered common shares, and as of January 31st, 2017, there were 156.100.000 shares outstanding (Annual Report). Of these, 22% are shares held by All Insider and 5% Owners, leaving the rest of the shares in free float (Yahoo Finance). The latter comprises mostly Institutional and Mutual Fund Owners, with more than 100 million shares to trade. With such a number of shares in free float, and with a daily average of 5 million traded shares, it is believed that the shares are easily traded in the public market.

5.4. Financial Statement Analysis

The financial analysis of Tesla is based on the past six years, since 2010. As some of Tesla's departments were created or grew very recently, the compounded growth rates are separated in two periods, one from 2010 and the other from 2014. The two departments that have a greater impact on this analysis are the "Automotive Leasing" and the "Energy Generation and Storage", both having started their activity in 2014.

Income Statement, in thousands	**2014**	**2015**	**2016**	**CAGR (10-16)**	**CAGR (14-16)**
Total automotive revenue	$ 3 007 012	$ 3 740 973	$ 6 350 766	100,7%	145,3%
% Sales Growth	*56%*	*24%*	*70%*		
Total revenues	$ 3 198 356	$ 4 046 025	$ 7 000 132	97,8%	147,9%
% Revenues Growth	*59%*	*27%*	*73%*		
Total automotive cost of revenues	$ (2 145 749)	$ (2 823 302)	$ (4 750 081)	97,5%	148,8%
% Cost Growth	*-45%*	*-32%*	*-68%*		
Total cost of revenues	$ (2 316 685)	$ (3 122 522)	$ (5 400 875)	99,4%	152,7%
% of Total Cost Growth	*-49%*	*-35%*	*-73%*		
Gross profit	$ 881 671	$ 923 503	$ 1 599 257	93,2%	134,7%
As a % of sales	*28%*	*23%*	*23%*		
Total operating expenses	$ (1 068 360)	$ (1 640 132)	$ (2 266 597)	52,9%	145,7%
% Growth of Operating Expenses	*-106%*	*-54%*	*-38%*		
Income (loss) from operations (EBIT)	$ (186 689)	$ (716 629)	$ (667 340)	-28,7%	-189,1%
% Growth	*-205%*	*-284%*	*7%*		
Income (loss) before income taxes (EBT)	$ (284 636)	$ (875 624)	$ (746 348)	-30,1%	-161,9%
% Growth of EBT	*-299%*	*-208%*	*15%*		
Net Income (Loss)	$ (294 040)	$ (888 663)	$ (773 046)	-30,8%	-162,1%
% Growth of Net Income (Loss)	*-297%*	*-202%*	*13%*		

Tesla has grown exponentially in the last years, since the IPO, with their revenues growing at a Compounded Annual Growth Rate (CAGR) of 97,8%. The greatest source of revenue is related to automotive sales, accounting for, on average, 86% of the revenues value. In 2016, the peak of the revenues was reached, having since 2010 a very high growth rate. The gross profit has increased by 73% from 2015, due to the significant increase in the automotive revenues (more than $2.5 billion). Despite these good results, being close to a completely vertically integrated company brings very high operating expenses with it. As Tesla have their own stores and have been developing alternative selling platforms, their Selling, general and administrative expenses represent almost the total amount of the Gross profit (~90% in 2016). Research and development is also important in the automotive, battery packs and solar energy segments, in order to keep up with the development of new technologies by their competitors. Consequently, Tesla's operating expenses are consuming more than the gross profit of the exercise. These high operating costs have a negative impact on the EBIT, and consequently on the Net income. A negative trend can be seen in Net income since 2010. However, in 2013 and 2016 recorded the greatest increases in the value of absolute revenues in a greater proportion than the other revenue and operating costs.

The negative Net income has a significant impact on the Return on Equity (ROE). If it is a Net loss, the return will also be negative and will destroy value to the shareholders. The Profit margin has been negative since 2010 and it represents the main driver for the negative ROE.

DuPont Analysis	2010	2011	2012	2013	2014	2015	2016	CAGR (10-16)	Var (15-16)
Profit Margin	-158.97%	-171.24%	-102.73%	-3.85%	-9.78%	-23.75%	-12.17%	65.16%	48.76%
Asset Turnover	25.14%	20.82%	34.62%	79.52%	51.57%	46.37%	28.02%	101.82%	-71.98%
Equity Multiplier	186.47%	318.44%	893.50%	362.29%	639.53%	744.48%	476.85%	116.94%	-35.95%
ROE	-74.54%	-113.55%	-317.73%	-11.09%	-32.25%	-82.00%	-16.26%	77.59%	80.17%

Analysing the Balance Sheet, one can conclude that Tesla's assets are mainly non-current. The net Property and the net Solar Energy Systems represent more than half of the total assets, with a value of almost $6 billion each. As Tesla is still in a steep growth stage, all the Balance Sheet accounts grew by a CAGR greater than 100%, the total shareholder's equity having increased the most from 2015. As shown in the figure below, leverage increased significantly, especially in regard to the equity, with the debt being equivalent to 283% of the equity.

Balance Sheet, in thousands	2010	2011	2012	2013	2014	2015	2016	CAGR (10-16)	Var (15-16)
Total Assets	$ 386,082	$ 713,448	$ 1,114,190	$ 2,416,930	$ 5,830,667	$ 8,067,939	$ 22,664,076	197.14%	180.92%
Total Liabilities	$ 179,034	$ 489,403	$ 989,490	$ 1,749,810	$ 4,860,761	$ 6,936,950	$ 16,750,167	213.07%	141.46%
Total Shareholder's Equity	$ 207,048	$ 224,045	$ 124,700	$ 667,120	$ 969,906	$ 1,130,989	$ 5,913,909	174.84%	422.90%
Debt/Assets	46%	69%	89%	72%	83%	86%	74%	108.08%	-14.04%
Debt/Equity	86%	218%	793%	262%	501%	613%	283%	121.87%	-53.82%

6. Weighted Average Cost of Capital (WACC)

The WACC is a valuable tool, commonly accepted by countless authors, used to discount the cash flows. It reflects the investor's expected compensation for the time value and risk related to Tesla's equity and debt. Considering the after-tax cost of debt and Tesla's capital structure, the WACC is equal to 8,52% (Appendix H).

6.1. Cost of Debt

The cost of debt is usually considered to be the yield to maturity on long-term option-free bonds for investment grade companies. The yield to maturity in Tesla's case is distorted, since it only has short-term convertible bonds. As referred in Chapter 2, another approach is used to determine the cost of debt by calculating the credit spread above the risk-free rate. The latest change to the company's rating was to a "B-" rating by S&P500 in 2014. This rating level suggests that the company has the necessary capabilities to meet financial commitments, even though it is vulnerable to adverse business and financial conditions. As concerns this rating, Damodaran (2014) assigns a credit spread of 5,5% for companies with market capitalization greater than USD 5 billion, that adjusted to the risk-free rate gives a total return on debt of 7,3%.

6.1.1. Effective Tax Rate

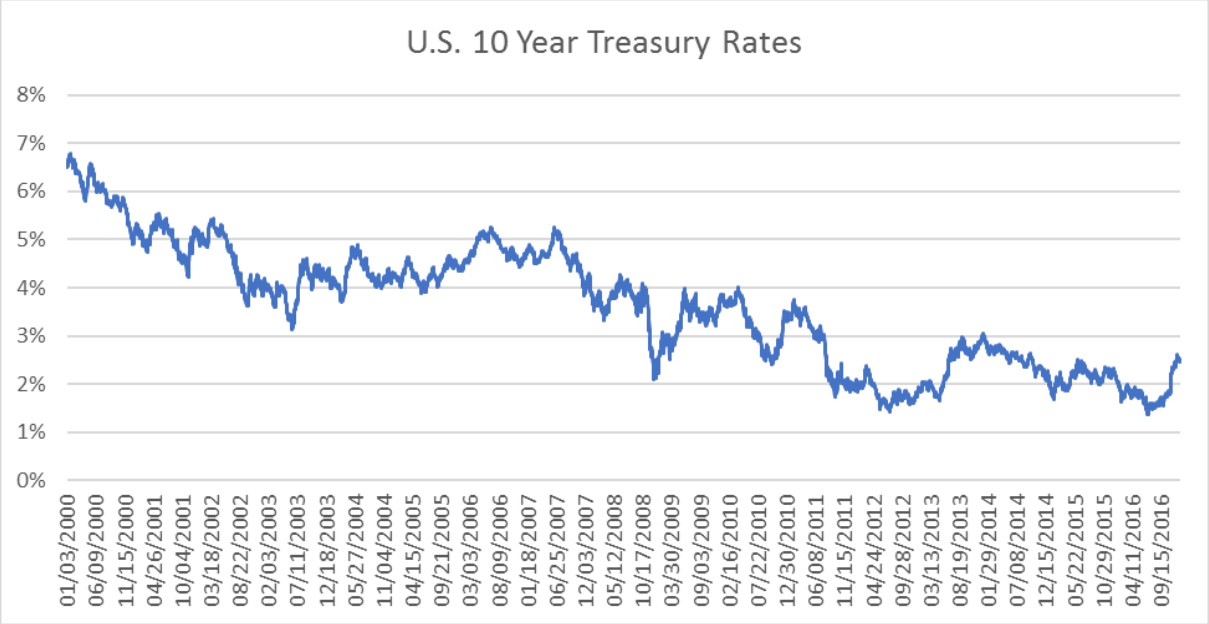
The tax benefit that comes with the payment of interest over existing debt should be considered when calculating the cost of debt as they will reduce tax liabilities. In this sense, the cost of debt used to calculate the WACC should be on an after-tax basis. The method used to calculate the tax rate goes in line with Damodaran (2012), who suggests using the actual statutory rate of the country of incorporation. The tax rate of 40% (KPMG 2017) in the U.S. would imply a reduction of the cost of debt to 4,38% (7,3% * (1 – 40%)).

6.2. Cost of Equity

The compensation for equity-holders is calculated through the CAPM. This formula is computed with the following inputs: the market risk-free rate, the systematic risk (Beta) and the equity risk premium.

6.2.1. Risk Free Rate

The risk-free rate considered for this analysis is the 10-year U.S. Treasury Bond. This riskless security is in a declining trend, and the maximum value was recorded in the most distant date from the period used. The rates have been registering historically low values, as seen below, being its minimum recorded on July 2016 with a value of 1,37%.



As of October 14th, 2016, the value of this rate was 1,8%, and since the rates are relatively low regarding this period's average (3,6%), a sensitivity analysis is necessary to account for possible changes in the rate affecting final price.

6.2.2. Systematic Risk

To measure the riskiness of Tesla's shares compared to that of the market, a regression between the share and the market's daily returns is made. The time frame used was two years, from January 2nd, 2014 back to December 30th, 2016. If a longer period than the one considered was used, the returns could not represent the future returns of a rapidly growing company as Tesla, and would be distorted by the recent financial crisis causing a bias in the beta calculation due to abnormally behaving stocks (Berk, DeMarzo, 2014). Regarding the market returns, two indexes were representative of the market in which Tesla competes. One if the S&P 500 Index that represents the 500 largest stocks in the U.S. market, where Tesla has the majority of its operations. The second index is the MSCI World Index (MSCI World, 2016), used to account for possible investment in risky shares outside of the country of incorporation. With these two indexes, it is considered that a representative set of data for the market is included in the

analysis. The betas were averaged and then adjusted, since in the long-run this value tends to 1. So, the following calculations were made:

$$adjusted\ \beta = \frac{2}{3} * (1{,}38) + \frac{1}{3} * (1) = 1{,}25$$

6.2.3. Market Risk Premium

The investors use this return as a reference to know the premium they would require when investing in a company operating in the same market as Tesla. Results for this premium tend to vary according to the period chosen and the risk-free security. Damodaran has estimated in January 2017 the Total Equity Risk Premium for the U.S. market as 5,69%.

6.3. Capital Structure

The final stage in the process of determining the WACC lies in the estimation of the company's target capital structure. The true market values of both Equity and Debt are unknown, so an approximation of the market values is used instead. Tesla has historically relied on equity financing, even though it has been changing since the IPO. The market value of Equity should be the product of the number of shares outstanding and the share price, adding the equity component of the convertible notes (Damodaran, 2012). With 156,100,000 shares outstanding and a share price of $196,51, the equity value from the shares accounts to $32,909,632,323.68. As for the option feature on the convertible senior notes, as convertible notes can be converted into a predetermined amount of the underlying company's equity, adding to the previous value $205,013,000 (2018 note), $920,000,000 (2019 note) and $1,138,000,000 (2021 note), it results in a final Equity value of $35,414,645,323.68.

The Debt used to weigh the return required by investors should be the Net Debt (Damodaran, 2012). This value is calculated by the difference between Long-term Debt ($5,860,049,000), and its current portion of Debt ($984,211,000), and Cash and Cash Equivalents ($3,393,216,000). The outcome of these calculations results in a Debt value of $3,451,044,000. According to the capital structure, the current ratios for Debt and Equity are 9.42% and 90.58%, respectively.

7. Forecasting

In the forecasting exercise, there are two factors that make Tesla highly sensitive and challenging to predict, such as the historical negative cash flows and the young age of the company. The value of the company is mostly based on future predictions, raising the company's value due to high probability of future creation. The forecasts in this chapter are mainly based on Tesla's Annual Reports from 2016 and before (Appendix K).

The time frame to be used in the analysis has an important role in the future cash flow estimation. The changing point of the analysis will be when the company is assumed to have reached a steady state performance. Until this point the growth rates of the company will reflect some of Tesla's predictions and expectations (Tesla Annual Report 2016), considering a constant growth for the terminal value, since the company is in a steady state. Tesla is more constrained by supply than demand, and therefore the explicit period should be long enough to allow for a balance between both. It is also unrealistic to assume that a company in a steady state grows more than the growth of the economy itself. Based on the conclusions from Chapter 5.2, the supply and the demand will only be balanced after 2020. Cheaper models, sufficient supply of battery cells with Gigafactory 1 fully operational, the Gigafactory 2 in Buffalo and new factories in Europe are the main reasons for a high growth in the next few years. Nonetheless, due to uncertainty constraints, two different growth periods will be considered: a high growth phase from 2016 up to 2020, when Tesla expects to have the Gigafactory fully operational, and a lower growth stage fading to the economy's growth from 2020 to 2024, where it is assumed that Tesla is already firmly implemented in Europe and in Buffalo with its Gigafactory 2.

7.1. Revenues

The first item to be analysed in the income statement, which is the one with higher volume, is "Total Revenues". In the past years, Tesla developed some new sources of revenue and the total amount is the sum of automotive revenues, leasing, energy generation and storage, and services and others. Thus, Tesla's revenues have two main bases, automotive and energy generation and storage. The former includes the sales of their three models and regulatory credits to other manufacturers, while the latter includes the sale of solar energy systems, incentives and their leases, as well as energy storage products. Tesla sold 84.000 vehicles in 2016, an increase of 64% from 2015. It is estimated that around 20.000 Model X cars were sold in 2016, following the same behaviour of Model S's growth on the first year after its introduction in the market.

Therefore, it is projected that the remaining 64.000 units sold were Model S cars. As the maximum capacity of the Gigafactory is expected to be reached in 2018 with the production of 500.000 vehicles, Model 3 will represent the remaining production in that year. This targeted production level is for the three models, assuming that after the introduction of Model 3 the other models will remain levelled. In 2017, it is predictable that Model X's growth will level both Model S and X sales. On the following year, with the high-volume production and cannibalization of the new model, the other Models will suffer a drop, especially Model S that is the most mature model of the company. Model X will also suffer from the introduction of the Audi Q6 e-Tron Quattro, expected to be in late 2018, losing unit sales in 2019. As for the mass market Model 3, it is expected to achieve a higher sales volume than the other models already in 2017. Since the full capacity of 500.000 vehicles is predicted for 2018, in order to still produce the Model S and X in 2018 at the same levels, the Model 3 production will grow exponentially. The acquisition of Grohmann Engineering GmbH in early 2017 is meant to facilitate and expand the production of these vehicles. In the period between 2018 and 2020 the main competitors will enter the electric vehicles market, even though Tesla's increased brand awareness with the introduction of new models will allow them to maintain production levels. From 2020 to 2024 the sales will still grow, due to the Gigafactory 2 and the European Gigafactory that will boost production, but at a lower rate fading to the maturity stage.

To reach a price, the years that only Model S was produced are considered. Dividing the value of automotive revenues by the number of vehicles sold will result in an average final price. The Model S was sold at a price 21% higher than the $70.000 base price. Applying the same margin, rounded to the nearest unit, we have the following prices for the other models:

Average Price	2013	2014	Base Price	Average Sale Price
Model S Unit Production	22,477	34,291	-	-
Model S Price	$ 85,504.16	$ 83,825.14	$ 71,300.00	$ 86,273
Model X Price			$ 88,800.00	$ 107,448
Model 3 Price			$ 35,000.00	$ 42,350
Price Margin				21%

For the period between 2020 and 2024, a 1% yearly price decrease is achieved by production efficiency (Appendix I).

To calculate the total automotive revenues, the "Automotive Leasing" must be forecasted. This refers to loans, leases and resale value guarantees, and it accounted for 14% of the automotive sales in 2016.

The resale value guarantees were discontinued in North America in late 2016, which leads us to predict a decrease in value for 2017. Assuming a certain growth in the European and Asian markets, it is expected that this represents a constant 10% of the Automotive sales thereafter.
With the acquisition of SolarCity, PowerPack 2, Powerwall 2 and the launch of solar roof, the sales and installation of which are planned for 2017, the "Energy Component and Storage" revenues will begin to have a significant weight on the total revenues. Tesla is cutting on advertising and is selling these products in their own stores, reducing the acquisition costs for the customers. Hence, with the benefits related to utility rates, these products will have a steep growth. Although the future of this department is quite unpredictable, it is assumed that it will have a year-on-year 10% growth.
Revenues from repairs, maintenance, merchandise and components sold to other companies are considered in "Service and Others". Despite the decrease in their relative weight in comparison to total automotive revenues in 2016, these revenues have been increasing 1 percentage point yearly. A slower growth is expected in 2017, meanwhile in the next years the 1 percentage point growth is going to be considered, which sums up to 15% of the automotive sales by the end of 2024.
Revenues from repairs, maintenance, merchandise and components sold to other companies are considered in "Service and Others". Despite the decrease in their relative weight in comparison to total automotive revenues in 2016, these revenues have been increasing 1 percentage point yearly. A slower growth is expected in the year of 2017, meanwhile in the next years the 1 percentage point growth is going to be considered, which sums up to a reasonable 15% of the automotive sales by the end of 2024 and from then onwards.

7.2. Profit Margin

To compute the profit margin, it is necessary to first forecast the Cost of Revenues. All the costs are calculated as a percentage of their relative revenues. Tesla has been able to reduce their costs by reducing the material costs, increased manufacturing efficiencies and minimization of scrapping materials. The cost of automotive revenues increased in 2016 due to Model X's higher cost structure than Model S. Meanwhile, this increase was offset by the enhanced vehicle reliability, reducing the warranty expenses. These costs include depreciation costs, which are estimated to grow, balancing out the future gains from the more efficient production of Model 3 and the help of GmbH company. Tesla also estimates that the battery costs will reduce in about 30% after 2018, implicating 5 percentage points reduction on that year (Appendix G).

After that, it is predictable that the company gradually reduces its ratio between automotive costs and revenues by 1 percentage point yearly until the level of 65%. As the cost of leasing has been growing significantly in the last years while maintaining its margin related to its revenues, it assumed that they will remain constant at 60% which is slightly below the 2014 to 2016 average.

The acquisition of SolarCity raised Tesla's energy costs to 98% of its respective revenues. However, it is believed that cutting advertising costs and selling the products in their stores is a way of reducing costs to the customer. The expectations go along with this idea, where Energy Generation and Storage costs decrease at a quick pace until they stabilize on 70% in 2020.

Finally, "Services and Other" is highly dependent on the volume of cars sold. Despite the volume of cars increases this cost, the maintenance service will become much cheaper with the new factories and technologies, allowing for a cost decrease of 5 percentage points until it reaches a stable 65% of its own revenues.

As a consequence of the Revenues and its Costs forecast, the profit margin's value is as expected. Since 2013, Tesla has presented a Gross Profit of 23%, except for 2014 with 28%, being the maximum recorded. The margin for 2017 is expected to be slightly higher than the previous years' one, due to the higher volume and efficiency. In 2018, the margin will be improved to 30%, considering the significant reduction on battery costs (Appendix G). Further on, Tesla will benefit from economies of scale and the sustainable competitive advantage created by battery manufacturing, allowing them to have a greater margin than the competition.

7.3. Operating Expenses

With an industry average of around 4% of total revenues, Tesla's R&D department has a clearly high cost margin, with an average margin of 14% in the last four years. With the development of Model 3, it is forecasted that in 2017 the R&D expenses will duplicate, representing 9% of the revenues. A constant value equal to the industry's long-term rate is considered thereafter.

The SG&A costs are a significant expense for Tesla's operations, since it represents the personnel and facilities costs related to the stores, and all the back-office activities. Due to Tesla's vertical integration characteristic, as the production grows, the need to expand stores and personnel arises. With the mass production in the years 2017 and 2018 due to Model 3 introduction in the market, SG&A will account to 15% of the total revenues. A smoothening effect will be noted in the two following years, with a ratio of 12%, and after 2020 it is expected to maintain its level at 10%.

Therefore, the EBIT will have a positive value and a constant growth, especially due to the cost reductions supra mentioned.

7.4. Interest Expenses and Taxes

When looking at the outstanding bonds the company has, it is possible to identify the expected interest to be paid over the forecasting period. The Interest Income between 2014 and 2016, was on average 0.7% of the profit before financial result, while the expenses represented more than 20%. Having this in mind, it is expected that the revenues will be stable along the evolution of the company and its operations, whereas the expenses decrease as the company gets less dependent from loans to sustain their business and operations, i.e. as it approaches maturity.

The foreign exchange rates gain and loss are depicted on Other Income and Expenses. Due to its unpredictability, it is assumed that the positive effects will balance out with the negative ones in the long run, and consequently the value will be zero.

Concerning the taxable income, it is subject to adjustments due to tax loss carry forwards. To offset future taxable income, the U.S. allows that the companies have federal tax losses carry forwards up to 20 years. As Tesla has negative Earnings Before Taxes, they will only need to pay taxes in 2019, when the tax loss carry forward is used up. Assuming the same federal tax rate calculated in Chapter 6.1.1, the tax estimations are as follows:

Income and Taxes, in thousands	2017	2018	2019	2020	2021	2022	2023	2024
Income (loss) before income taxes (EBT)	$ (375,083)	$ 2,589,779	$ 4,154,893	$ 4,896,734	$ 6,645,922	$ 7,460,720	$ 8,362,056	$ 8,992,595
Total tax loss carryforwards	$ (3,157,271)	$ (567,492)	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Income			$ 3,587,401	$ 4,896,734	$ 6,645,922	$ 7,460,720	$ 8,362,056	$ 8,992,595
Taxes			$ 1,434,960	$ 1,958,694	$ 2,658,369	$ 2,984,288	$ 3,344,823	$ 3,597,038

7.5. FCFF Inputs

The first two variables to be calculated are the Capital Expenditures and the Depreciations and these depend on the evolution of Property, Plant & Equipment (PP&E). As it is referred in Tesla's Annual Report (2016), to accomplish the objective of producing 500.000 vehicles in 2018, it is necessary to continue to invest heavily in capital expenditures. The company has already a big investment portfolio and assuming that this will stay constant regarding the average weight on revenues of the last five years, it is expected that the PP&E lowers 75% of the total revenues. With this value defined, it is possible to use the same method for the

depreciations rate. Since 2012, an average of 9% of PP&E has been representative of the depreciations value, and it is assumed that this rate will remain constant.

With these items already projected, it is possible to use a formula to compute the value of the Capital Expenditures (CapEx):

$$CapEx_t = Net\ PP\&E_t - Net\ PP\&E_{t-1} + Depreciations_t$$

After analysing the results for the CapEx it is noted that it evolves along the expectations, having a big increase in the year 2017 due to Model 3 mass production, representing almost 70% of the PP&E, and after this period stabilizes at an average of 15%.

Finally, the Net Working Capital (NWC) to be used in the valuation is the adjusted difference between current assets and liabilities, since some items are not included. Following the DCF methodology, the items that allow the computation of NWC are the ones in the table below.

	2017	2018	2019	2020	2021	2022	2023	2024
Accounts receivable	$ 939 376	$ 1 680 821	$ 1 750 647	$ 1 861 985	$ 1 996 683	$ 2 144 214	$ 2 305 917	$ 2 483 277
As a % of Total Revenues								
Inventory	$ 5 912 367	$ 9 933 507	$ 10 175 168	$ 10 621 701	$ 11 139 647	$ 11 826 761	$ 12 576 411	$ 13 549 035
As a % of Total Revenues Costs								
Prepaid expenses and other current assets	$ 563 626	$ 1 008 493	$ 1 050 388	$ 1 117 191	$ 1 198 010	$ 1 286 528	$ 1 383 550	$ 1 489 966
As a % of Total Revenues								
Other assets	$ 1 127 252	$ 2 016 986	$ 2 100 776	$ 2 234 382	$ 2 396 019	$ 2 573 056	$ 2 767 100	$ 2 979 933
As a % of Total Revenues								
Accounts payable	$ 5 636 258	$ 10 084 929	$ 10 503 880	$ 11 171 909	$ 11 980 095	$ 12 865 281	$ 13 835 501	$ 14 899 664
As a % of Total Revenues								
NWC	$ 651 859	$ 520 906	$ 371 547	$ 194 586	$ (41 776)	$ (180 835)	$ (336 724)	$ (357 318)
Change in NWC	$ (32 110)	$ (130 953)	$ (149 360)	$ (176 961)	$ (236 361)	$ (139 059)	$ (155 889)	$ (20 594)

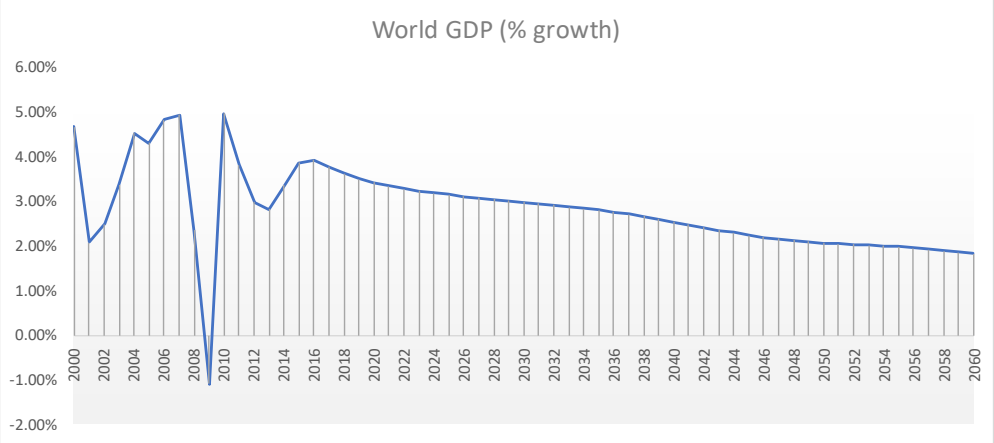
To forecast their evolution, the average value of the last five years weight on the revenues, except for inventories that is in relation to cost of revenues, was calculated. It is further assumed that the development of these items is a function of the revenues and its costs and it is predicted the stability of these weights.

8. Valuation

8.1. Discounted Cash Flow Valuation

8.1.1. Terminal Growth Rate

As the Net Debt was already calculated to compute the WACC, the only remaining variable for the valuation is the Terminal Value's growth rate. Tesla's sales in North America represent half of the company's revenues, hence they are expanding to other regions in the globe. They have the objective of further investing outside the U.S., especially in regions that they are already present, such as Europe and Asia. To capture the expected sales growth to all of these locations, causing a loss of relative weight for the U.S., it is forecasted that Tesla's growth from 2024 onwards is equal to the global GDP growth average projections. As seen in the graph below, despite the recent volatility of this indicator, it is expected to stabilize in the future, with an average growth rate of 2,47% between 2024 and 2060.



Source: Compiled by author/OECD Data

8.1.2. Valuation Result and Analysis

The DCF model using the Free Cash Flow to the Firm (FCFF) method, estimates in the first place the Enterprise Value of the company, that represents the value of all future cash flows. The Equity Value is computed to achieve Tesla's share price by deducting the Net Debt from the Enterprise Value and dividing by the number of shares outstanding (Appendix L).

DCF Model, in thousands	2016
Enterprise Value	$ 53 806 028
Net Debt	$ 3 451 044
Equity Value	$ 50 354 984
Number of shares outstanding	156 100 000
Share Price, USD	$ 322,58

The estimated cash flow is negative for the first three years, due to the high Capex requirements and fixed costs that arise from the entire process of producing and selling the new Model 3. With this model's market entry, the company will be able to capture the return on these investments more efficiently than they did before, especially due to the higher cost efficiency. Even though, this effect is expected to be noted on the long term, only after the explicit period, which has a negative present value.

As of 14th October 2016, Tesla has closed with a price of $196.51 per share, which is undoubtedly lower than the $322.58 computed. As referred, the explicit period forecast represents a negative part of the cash flows, and therefore the terminal value represents more than the totality of the enterprise value. The significant impact of this variable will be addressed in the sensitivity analysis. Nevertheless, it is expected that the market price tends to reach the value calculated, following the conclusion that the market is undervaluing the company. Considering these aspects, buying Tesla's shares would represent a good investment strategy.

8.2. Relative Valuation

8.2.1. Peer Group

In the market, among companies that compete there are some more alike than others, even though their characteristics are never the same. As Tesla is a company with very high growth rates and despite its negative earnings its price is considerably high, the peer group will have financials somehow different. After analysing the automotive market, which has a wide range of players and a very high sales volume, the peer group was defined considering some relevant features, such as the business model, the quality of the vehicles, their international position and some financial dimensions. The financial variables can be seen from the table below and they help to assess the firms' returns on investments, risks and margin

Peer Group	ROIC	ROE	EBITDA Margin	Beta 5 Years	D/E
Toyota Motor Corp (USD,JPY)	6.90	13.60	15.80	1.12	1.09
Bayerische Motoren Werke AG (USD,EUR)	6.10	15.30	18.50	1.38	2.00
General Motors Co (USD)	7.20	22.50	12.50	1.32	1.93
Ford Motor Co (USD)	3.20	15.90	10.90	1.08	4.90
Audi AG (USD,EUR)	5.60	8.60	14.60	0.38	0.11
Tesla Inc	-7.40	-23.10	4.00	1.23	1.26

8.2.2. Multiples Valuation

Although two different multiples are referred in Chapter 2.3, the Price-to-Earnings and the Enterprise Value-to-EBITDA, only the latter will be used in this analysis. As Tesla has been presenting negative Net Income, it is not possible to accurately use the P/E multiple, since it

will retrieve a negative value. Instead, it is considered the EBITDA for this analysis, and the multiple is forward looking, i.e. next twelve months (NTM). The values are taken from Reuters, considered a reliable source, even though it was assumed that Audi's forward multiple would be the same as the historical one, since there is no data available.

Multiples	**EV/EBITDA**	**Forward EV/EBITDA**
Toyota Motor Corp (USD,JPY)	9.76	9.98
Bayerische Motoren Werke AG (USD,EUR)	8.08	9.02
General Motors Co (USD)	5.56	5.70
Ford Motor Co (USD)	22.72	12.54
Audi AG (USD,EUR)	1.83	1.83
Peers Average	9.59	7.81
EBITDA 2016	$ 1,599,257,000	-
EBITDA 2017	-	$ 4,710,464,126
Enterprise Value	$ 15,336,874,630	$ 36,807,566,684
Equity Value	$ 11,885,830,630	$ 33,356,522,683.69
Shares outstanding	156,100,000	156,100,000
Tesla Inc	**$ 76.14**	**$ 213.69**

The valuation results reflect the growth stage that Tesla is going through, and this is the main reason for the very low price for the historical multiple. Even though the peer's average reduces from historical to forward, the abnormal increase in EBITDA raises the price higher than the market price of $196.51.

9. Sensitivity Analysis

9.1. WACC and Growth Rate

The valuation through DCF model is highly dependent on assumptions about future events and developments that are subject to uncertainty. If the forecasts do not hold, the share price will change accordingly. The share price is more sensitive to certain inputs and these are the variables to focus on this section. The terminal value accounts for more than 100% of the enterprise value This is calculated using the terminal growth rate and the share price is highly sensitive to it, causing big price impact with small variation of the rate. The estimation of WACC depends on several assumptions and leads to uncertainty about its final value. Furthermore, it also has a big impact on the price, since it is used to discount all the future cash flows to present values.

These two inputs were exposed to positive and negative differences of 0,5% and their respective result is presented below:

		Terminal g						
		1.00%	1.50%	2.00%	2.50%	3.00%	3.50%	4.00%
WACC	7.00%	$ 325.14	$ 360.98	$ 404.01	$ 456.60	$ 522.35	$ 606.91	$ 719.68
	7.50%	$ 293.92	$ 324.25	$ 360.10	$ 403.12	$ 455.71	$ 521.46	$ 606.02
	8.00%	$ 267.07	$ 293.07	$ 323.40	$ 359.25	$ 402.27	$ 454.86	$ 520.61
	8.50%	$ 243.73	$ 266.25	$ 292.25	$ 322.58	$ 358.43	$ 401.45	$ 454.05
	9.00%	$ 223.23	$ 242.95	$ 265.47	$ 291.47	$ 321.80	$ 357.65	$ 400.67
	9.50%	$ 205.10	$ 222.49	$ 242.20	$ 264.73	$ 290.72	$ 321.05	$ 356.90
	10.00%	$ 188.92	$ 204.38	$ 221.77	$ 241.48	$ 264.01	$ 290.01	$ 320.34

The green colour represents the higher share price according to the variation of the inputs, and the red colour the lowest. From the analysis, it is noted that the price is slightly more sensitive to changes in the WACC than to the terminal growth rate, amplifying the difference with more extreme results. The reason behind this is that WACC is used to discount all the cash flows of all periods, including the terminal value. However, the most pessimistic view of the analysis is an extreme case, since it only considers that Tesla would grow at a rate of 1% from 2024 onwards. Considering this, the most pessimistic cases are not that distant from the price of the market of $196,51.

With this analysis, it is concluded that from the 49 different alternatives, only for the most pessimist combination between WACC and terminal growth rate, the recommendation to buy Tesla's shares would not stand.

9.2. Future Tax Rates

Following the most recent changes in the United States, with the election of President Trump, some considerations should be made regarding the overall state of the economy. As uncertainty raises in the financial markets, due to the unpredictability of the actions and decisions that the President of the U.S. is expected to take, the economic context to consider as a factor impacting the evaluation becomes even more critical.

It is expected that the Congress of the United States passes a tax cut amounting to $1 trillion over the coming 10 years, representing a personal and corporate tax rate of around 28%. This implementation of this plan is likely to start already 2018, impacting both individual and corporate taxes equally. Besides this, an international corporate tax reform allowing companies to bring their cash back to the U.S., by reducing the tax rate on foreign profits, is also expected. As Tesla is directly impacted by these decisions, a sensitivity analysis regarding this variable, the USA taxes, is presented below:

		Terminal g						
		1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%
Corporate Taxes	15%	$ 495.58	$ 532.44	$ 574.82	$ 624.08	$ 682.03	$ 751.19	$ 835.17
	20%	$ 446.03	$ 480.13	$ 519.37	$ 565.01	$ 618.75	$ 682.96	$ 761.03
	25%	$ 396.07	$ 427.36	$ 463.40	$ 505.34	$ 554.77	$ 613.89	$ 685.87
	30%	$ 345.71	$ 374.13	$ 406.89	$ 445.05	$ 490.06	$ 543.96	$ 609.67
	35%	$ 294.93	$ 320.43	$ 349.84	$ 384.13	$ 424.62	$ 473.15	$ 532.40
	40%	$ 243.73	$ 266.25	$ 292.25	$ 322.58	$ 358.43	$ 401.45	$ 454.05

The scenario of raising taxes is completely left out, it is also known that the reduction of taxes will entry into force in 2018. As Trump is considering a radical change in taxes, the different scenarios differ from each other by 5 p.p. (Appendix M).

The Table above shows that impact of divergent tax rates triggers extremely distinct resulting values. Considering the base case (g = 2,5%), it is expected that the value of the share will be much higher than the one with 40% tax. As referred previously, it is probable that the taxes will converge to 28%, positioning the value of the base case between $445,05 and $505,34.

As pointed out by Domm (CNBC, 2017), this news brought instability to the financial markets, having a negative impact on some U.S. stocks and currency. According to the less optimistic market expectations, the terminal growth rates will be impacted in an unfavourable way. For Tesla, in case a tax cut is confirmed, a growth rate lower than 2,5% is more realistic. Even though, this still represents a higher value than the base case $322,58 per share.

10. Research Report Comparison

The consistency of the results achieved in this dissertation are confirmed by comparing these results to a research report from Robert W. Baird published after the third quarter of 2016. The investment bank considers that the stock is outperforming and the results of their analysis lead to a target price of $338. This translates into a buy recommendation that is based on the optimistic estimates, especially because they believe the Gigafactory is "on time and ahead of budget". Being far from its full capacity, the investment bank believes that progress updates will be catalysts for the share price. Investors have a concern on discounts over vehicle prices, however Tesla's Management explained that these are not meant for new vehicles produced at the factory, dissipating the focus. Though, the analysis also considers the higher R&D costs and the lower Average Selling Prices for the following years, reducing the predictions for 2017. The models and the energy component are also forecasted to grow and outperform the competition.

The target price of Robert W. Baird is consistent with our analysis made on previous chapters, accounting for a difference of less than $20 per share. Thus, it is clearly higher than the market price, reinforcing the buy recommendation.

	Investment Bank		Dissertation	
	2016	2017	2016	2017
Revenues	$8,189,900	$12,509,800	$7,000,132	$18,787,528
% Change	53%		168%	
Gross Profit	$1,803,700	$ 3,277,300	$1,599,257	$ 4,710,464
% Change	82%		195%	
Operating Income	$ -4,900	$ 445,000	$ -667,340	$ 177,270
% Change	9182%		127%	
Net Income	$ -49,500	$ 405,700	$ -773,046	$ -375,083
% Change	920%		51%	

From the figure above it can be noted that the assumptions used significantly differ from the investment note to the dissertation. The divergence occurs especially in regard to operating expenses. This dissertation considers a more conservative value for the operating expenses growth, forecasting double the cost of the operating expenses for the years in regard. Despite the differences in both analysis, the outcome is very similar and, therefore different from the market value of Tesla's shares on the same day. The beliefs from the two analyses are aligned in the sense that the shares are going to converge to a much higher value and the recommendation is clearly to buy.

11. Conclusion

This study has been conducted to challenge the current market price of Tesla, Inc. shares, by applying valuation methods with different assumptions to determine the fair value of the company. The idea of comparing both valuations is meant to evaluate whether, the share price of $196,51 on 14th October 2016 provides an attractive investment opportunity.

With the conclusion that the valuation based on DCF gives the best estimate for the fair value of Tesla, the intrinsic share price was found to be $322,58. Over time it is expected that the market share price will converge to a value close to the one computed, assuming that the share price reflects the fundamentals of the company and the investor's beliefs. In such a scenario, the recommendation is to buy since an abnormally high return in the region of 64% will be registered.

The accuracy in determining the share price of a fast-growing company is highly diminished, due to the uncertainty of future expectations. Though, these expectations regarding future earnings represent a big percentage of the share price. The less uncertain fraction of the share, reflected by the current book value of equity, is very reduced when weighed against the share value, leaving the remaining value dependent on future expectations. This adds a high stake of instability and uncertainty towards the future value of the company, and therefore, to the price of Tesla today. As in many fast-growing companies, this represents one of the greatest risks for investors.

This paper largely relies on estimations presented by Tesla, especially regarding the expected delivery of 500.000 cars by 2018. As Tesla is more constrained by supply than by demand, the investor's decision of investment becomes highly dependent on the accomplishment of this production goal in such a short time. Though, in the sensitivity analysis, it is clear that even based on the most pessimistic assumptions, the value of the share would not be very different from the market value.

Despite the identified risks, the current environment on the automotive industry seems to favour the growth of a company like Tesla, which is already benefiting from a clear "first mover advantage". If the future expectations translate into value, there is a solid basis to sustain the assumptions that lead to computing a price of $322.58, which makes Tesla a great investment opportunity.

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13. Appendices

Appendix A: Electric Vehicles Different Segments

Tesla competes not only in a market based on the traditional car segment but with higher incidence on the market for vehicles that run on alternative fuels: more specifically in the EV's (Electric Vehicles) market. This market is divided into four segments: Hybrid Electric vehicles (HEV), Plug-in Hybrid Electric Vehicles (PHEV's), Battery Electric vehicles (BEVs), and Fuel-Cell Electric Vehicles (FCEV's).

- HEV's and PHEV's: HEV's are vehicles powered simultaneously by an internal combustion engine and an electric battery. However, they can only be refueled with fossil fuels since the electric battery can only be recharged with the regenerative braking system. PHEV's are similar to HEV's but their electric battery can be recharged through an external source of electrical power.
- BEV's: vehicles fully powered by a single energy storage system (electric batteries) that have to be replenished with an external source of electrical energy. Model S is an example of this type of vehicle.
- FCEV's: just like the BEV's, these vehicles use only one electric motor. However, the way the energy is stored is quite different: the vehicle's fuel cell contains hydrogen that mixes with the oxygen in the air to produce electricity. This electricity then feeds the electric motor. The recharge of the fuel cell's hydrogen levels is done in 5 minutes, and the only by-product of the process is water.

Appendix B: Tesla’s Product Description

The electric vehicles are powered by a small battery pack and a small silent electric motor, instead of the traditional noisy engine. The electric motor only has a fraction of the hundreds of moving parts of a traditional engine and no need for tune-ups and oil-changes. The light battery and electric motor in the bottom centre of the car also give better weight distribution, handling, safety, and leaves room for two trunks. Because of the two trunks, the cars have best in class storage space. The cars have zero emissions and can be recharged by plugging the power cord in almost any electrical station. The recharge can be done overnight at home, saving the trips to the gas station. For faster recharging, Tesla’s Supercharger network can be used for free (Annual Report 2016). One of the major drawbacks of electric cars is the relatively short range they can go, before a recharge is needed. To increase the range, Tesla’s cars are the first

to be made of lightweight aluminium instead of steel. The cars come with a 17-inch touchscreen instead of the traditional dashboard, and the door handles have senses, so they pop out, when the driver gets close to them. They also come without a clutch and gearshift, leaving extra space inside the cars.

Model S:

The Model S sedan was introduced in June 2012. The customer can choose between Model S 70, Model S 70D, Model S 90D, and Model S P90D, where D is short for dual motor or all-wheel drive, and 70 or 90 is the kWh battery capacity. The Model S P90D has extra performance with the ludicrous speed upgrade enabling acceleration from 0-100 km/t in 3.0 seconds instead of 3.3, making it one of the quickest accelerating cars in the world. The range of the different batteries goes from around 420 km to around 700 km, before a recharge is needed.

Model X:

In September 2015, Tesla started deliveries of the Model X SUV in the US and plan to start deliveries in Europe and Asia in 2016 (Annual Report, 2016). The Model X offers exceptional safety with the absence of the front engine, its automatic emergency braking, and side collision avoidance technologies, and offers air quality in the car similar to a hospital operating room due to the special HEPA air filters. It offers automatically opening and closing doors using sensory technology. There is seating for seven adults, and falcon-wing doors that offer better access to the two rear rows of seats. Like the Model S, the Model X comes in different versions, though with all-wheel drive as standard. The versions are 70D, 90D, and P90D. The range goes from around 417km to around 542km., before a recharge is needed. The 0-100 km/t acceleration is between 3,1 to 6,2 seconds on the different versions (Tesla Motors 2016). New versions and functionality are also expected to be introduced over time for the Model X.

Model 3:

The Tesla Model 3 is not yet being commercialized, and it is bringing the expectations high for its launch. This car is expected to reach out to the mass market, counting already with 400.000 pre-ordered units. Despite having better price conditions, it does not lack in quality. It combines the real-world range, performance safety and spaciousness into a premium sedan. The range of

this car goes up to 345 Km and its performance from 0-100 km/t is under 6 seconds. It combines the most important features for the mass market target population – the range, 5-star safety rating, autopilot hardware, supercharging and low price.

The energy storage products:

In addition to the cars, Tesla has from its energy management technology developed products that can store power generated by solar panels in homes and commercial sites. The Powerwall and Powerpack can be used as backup power, and make it possible to store and use the power generated by solar panels during the day, after the sun goes down. They also make it possible to detach from the power grid, and only use the grid, when electricity prices are low.

The production of the energy storage products has been moved from the car factory in Fremont to the Gigafactory in Nevada in the last quarter of 2015. This enables Tesla to ramp production of these products.

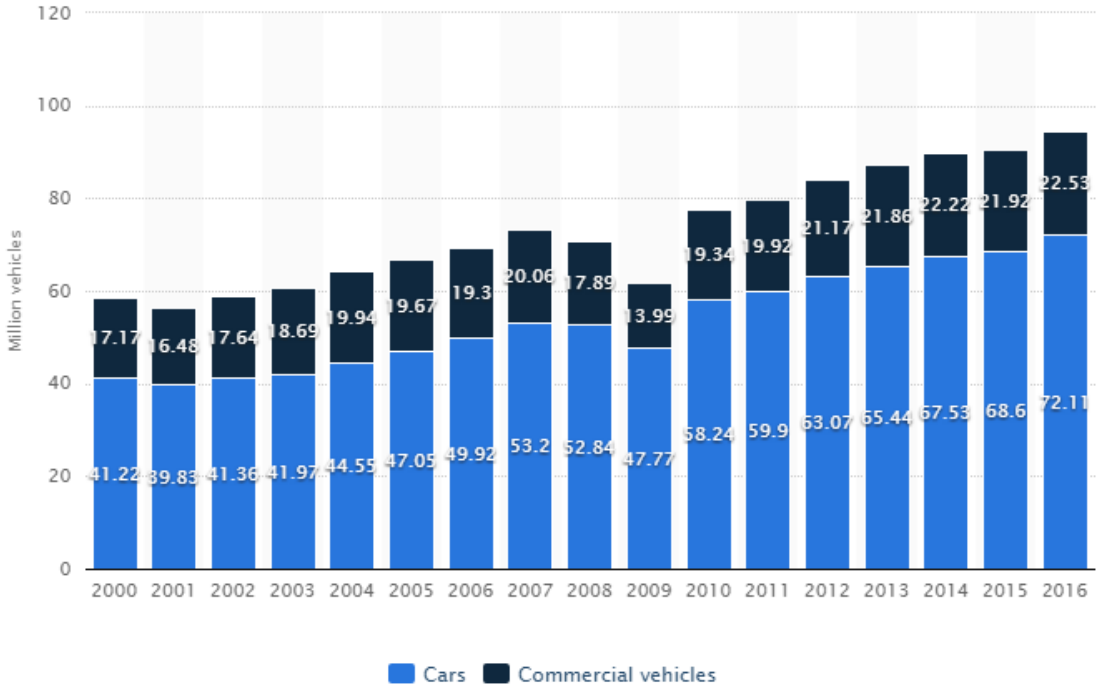
Appendix C: Government Incentives for Electric Vehicles

	US	Norway	Netherlands	Switzerland	China
Taxes	$7,500 Federal tax credit	Lower annual fee; higher milage allowance writedown; 50% discount on company car tax	No private vehicle motor tax until 2017; 4% tax credit for 5 years	No annual road tax for some regions	Up to $9,800 tax credit
Subsidies	Various purchase subsidies and rebates for Evs				Free vehicle licence worth up to $14,00
Bus Lanes	Access to HOV lanes	Bus lane access			
Parking	Parking Incentives for Evs	Free access to some parks and exclusive parking spots			
Other	Several other incentives for EV owners	Free pass in toll roads			

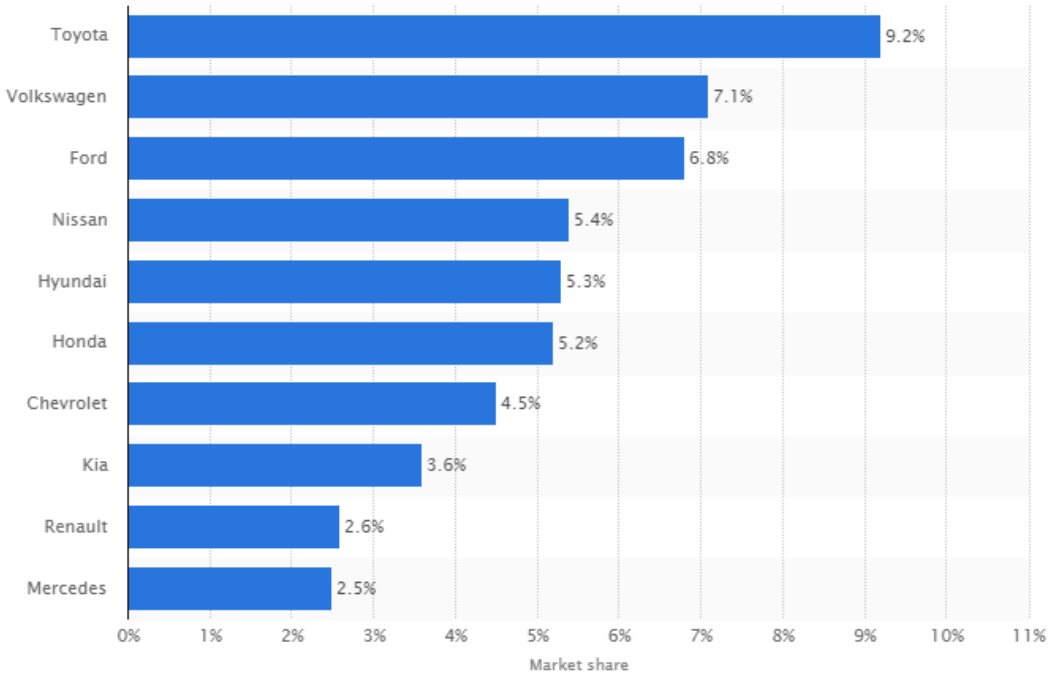
Source: Tesla, Inc.

Appendix D: Competitors

Worldwide automobile production from 2000 to 2016 (million vehicles)



Global car market share of the world's largest automobile Original Equipment Manufacturers in 2016



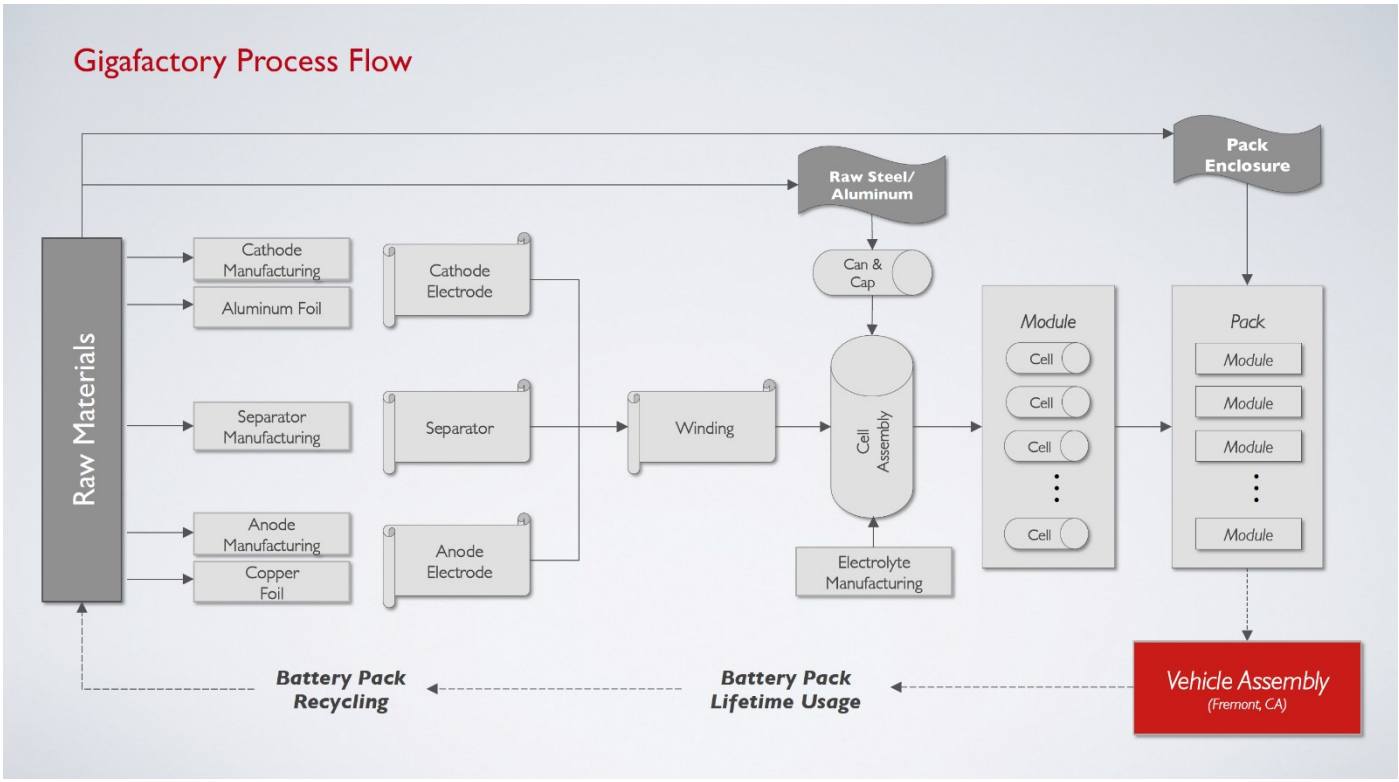
Appendix E: Supercharger Networks

North America

Europe

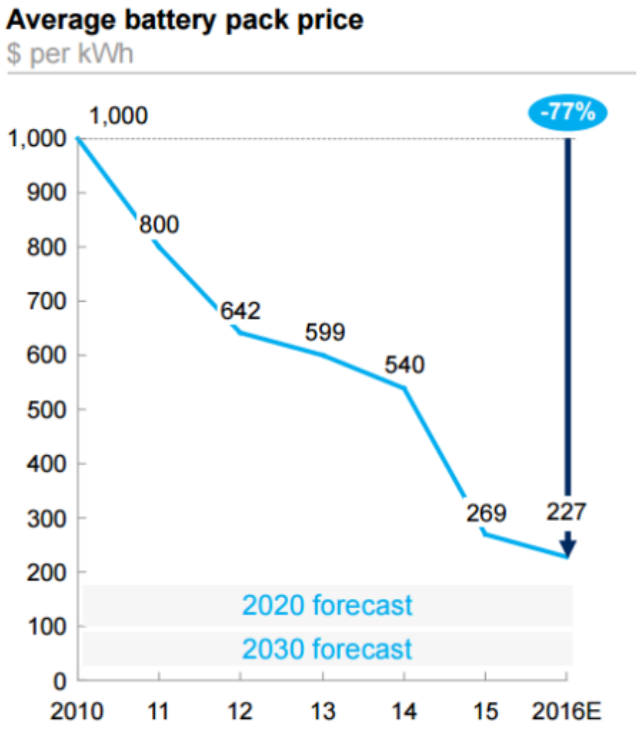
China and Australia

Appendix F: The Gigafactory Process



Source: Tesla, Inc.

Appendix G: Battery Cost Forecast



Appendix H: WACC calculations

Beta S&P	1,35
Beta MSCI	1,41
Average Betas	1,38

Adjusted Beta	1,25
Market Risk Premium	5,69%
Risk-Free Rate	1,8%
COST OF EQUITY	8,92%

Risk-Free Rate	1,80%
Average Credit Spread (B-)	5,5%
COST OF DEBT	7,30%

D/V	9,42%
COST OF DEBT	7,30%
TAX RATE	40,00%
E/V	90,58%
COST OF EQUITY	8,9%
WACC	8,50%

Appendix I: Vehicles Prices

	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
Model S	64 000	57 600	57 600	58 752	59 927	61 126	62 348	63 595
% Growth	*0%*	*-10%*	*0%*	*2%*	*2%*	*2%*	*2%*	*2%*
Model X	60 000	57 000	54 720	55 814	56 931	58 069	59 231	60 415
% Growth	*200%*	*-5%*	*-4%*	*2%*	*2%*	*2%*	*2%*	*2%*
Model 3	80 000	384 000	403 200	423 360	465 696	512 266	563 492	619 841
% Growth	*-*	*380%*	*5%*	*5%*	*10%*	*10%*	*10%*	*10%*
Total Units	204 000	498 600	515 520	537 926	582 554	631 460	685 071	743 852
% Growth		*144%*	*3%*	*4%*	*8%*	*8%*	*8%*	*9%*
Model S Average Price	$ 86 273	$ 86 273	$ 86 273	$ 86 273	$ 85 410	$ 84 556	$ 83 711	$ 82 873
% Price Change	*0%*	*0%*	*0%*	*0%*	*-1%*	*-1%*	*-1%*	*-1%*
Model X Average Price	$ 107 448	$ 107 448	$ 107 448	$ 107 448	$ 106 374	$ 105 310	$ 104 257	$ 103 214
% Price Change	*0%*	*0%*	*0%*	*0%*	*-1%*	*-1%*	*-1%*	*-1%*
Model 3 Average Price	$ 42 350	$ 42 350	$ 42 350	$ 42 350	$ 41 927	$ 41 507	$ 41 092	$ 40 681
% Price Change	*0%*	*0%*	*0%*	*0%*	*-1%*	*-1%*	*-1%*	*-1%*
Automotive Revenues Forecasts	$ 15 356 352	$ 27 356 261	$ 27 924 399	$ 28 995 153	$ 30 699 306	$ 32 546 539	$ 34 549 503	$ 36 721 973

Appendix J: Historical Income Statement and Balance Sheet

Consolidated Balance Sheet (in thousands, except per share data)	Dec, 31			
	2013	2014	2015	2016
Assets				
Current assets				
Cash and cash equivalents	$ 845 889	$ 1 905 713	$ 1 196 908	$ 3 393 216
Short-term marketable securities	-	-	-	105 519
Restricted cash and marketable securities	3 012	17 947	22 628	-
Accounts receivable	49 109	226 604	168 965	499 142
Inventory	340 355	953 675	1 277 838	2 067 454
Prepaid expenses and other current assets	27 574	76 134	115 667	194 465
Total current assets	1 265 939	3 180 073	2 782 006	6 259 796
Operating lease vehicles, net	382 425	766 744	1 791 403	3 134 080
Solar energy systems, leased and to be leased, net	-	-	12 816	5 919 880
Property, plant and equipment, net	738 494	1 829 267	3 403 334	5 982 957
Intangible assets, net	-	-	-	376 145
MyPower customer notes receivable, net of current portion	-	-	-	506 302
Restricted cash	6 435	11 374	31 522	268 165
Other assets	23 637	43 209	46 858	216 751
Total assets	$ 2 416 930	$ 5 830 667	$ 8 067 939	$ 22 664 076
Liabilities and Stockholders' Equity				
Current liabilities				
Accounts payable	$ 303 969	$ 777 946	$ 916 148	$ 1 860 341
Accrued liabilities	108 252	268 883	422 798	1 210 028
Deferred revenue	91 882	191 651	423 961	763 126
Capital lease obligations, current portion	7 722	-	-	-
Resale value guarantees	-	-	136 831	179 504
Customer deposits	163 153	257 587	283 370	663 859
Current portion of long-term debt and capital leases	182	611 099	627 927	984 211
	-	-	-	165 936
Total current liabilities	675 160	2 107 166	2 811 035	5 827 005
Common stock warrant liability	-	-	-	-
Capital lease obligations, less current portion	12 855	-	-	-
Long-term debt and capital leases	586 119	1 818 785	2 021 093	5 860 049
Solar bonds issued to related parties, net of current portion	-	-	-	99 164
Convertible senior notes issued to related parties	-	-	-	10 287
Deferred revenue	181 180	292 271	446 105	851 790
Resale value guarantees	236 299	487 879	1 293 741	2 210 423
Other long-term liabilities	58 197	154 660	364 976	1 891 449
Total liabilities	1 749 810	4 860 761	6 936 950	16 750 167
Commitments and contingencies				
Redeemable noncontrolling interests in subsidiaries	-	-	-	367 039
Convertible senior notes	-	58 196	47 285	8 784
Stockholders' equity:				
Preferred stock; $0.001 par value; 100,000 shares authorized; no shares issued and outstanding	-	-	-	-
Common stock; $0.001 par value; 2,000,000 shares authorized as of December 31, 2016 and December 31, 2015; 161,561 and 131,425 shares issued and outstanding as of December 31, 2016 and December 31, 2015, respectively	123	126	131	161
Additional paid-in capital	1 806 617	2 345 266	3 409 452	7 773 727
Accumulated other comprehensive income (loss)	-	-22	-3 556	-23 740
Accumulated deficit	-1 139 620	-1 433 660	-2 322 323	-2 997 237
Total stockholders' equity	667 120	911 710	1 083 704	4 752 911
Noncontrolling interests in subsidiaries	-	-	-	785 175
Total liabilities and stockholders' equity	$ 2 416 930	$ 5 830 667	$ 8 067 939	$ 22 664 076

Consolidated Income Statement	dez/31				CAGR	CAGR
(in thousands, except per share data)	2013	2014	2015	2016	(10-16)	(14-16)
Revenues						
Automotive	$ 1 921 877	$ 2 874 448	$ 3 431 587	$ 5 589 007	96,5%	139,4%
% Sales Growth	*398%*	*50%*	*19%*	*63%*		
Automotive leasing	$ -	$ 132 564	$ 309 386	$ 761 759	0,0%	239,7%
% Sales Growth	*-*	*-*	*133%*	*146%*		
Total automotive revenue	$ 1 921 877	$ 3 007 012	$ 3 740 973	$ 6 350 766	100,7%	145,3%
% Automotive Sales Growth	*398%*	*56%*	*24%*	*70%*		
Energy generation and storage	$ -	$ 4 208	$ 14 477	$ 181 394	-	656,6%
% Revenues Growth	*-*	*-*	*244%*	*1153%*		
Services and other	$ 91 619	$ 187 136	$ 290 575	$ 467 972	69,6%	158,1%
% Services Growth	*232%*	*104%*	*55%*	*61%*		
Total revenues	$ 2 013 496	$ 3 198 356	$ 4 046 025	$ 7 000 132	97,8%	147,9%
% Revenues Growth	*387%*	*59%*	*27%*	*73%*		
Cost of revenues						
Automotive	$ (1 483 321)	$ (2 058 344)	$ (2 639 926)	$ (4 268 087)	94,0%	144,0%
% Cost Growth	*-299%*	*-39%*	*-28%*	*-62%*		
Automotive leasing	$ -	$ (87 405)	$ (183 376)	$ (481 994)	-	234,8%
% Cost Growth	*-*	*-*	*-110%*	*-163%*		
Total automotive cost of revenues	$ (1 483 321)	$ (2 145 749)	$ (2 823 302)	$ (4 750 081)	97,5%	148,8%
% Cost Growth	*-299%*	*-45%*	*-32%*	*-68%*		
Energy generation and storage	$ -	$ (4 005)	$ (12 287)	$ (178 332)	-	667,3%
% Cost Growth	*-*	*-*	*-207%*	*-1351%*		
Services and other	$ (73 913)	$ (166 931)	$ (286 933)	$ (472 462)	106,9%	168,2%
% Cost Growth	*-541%*	*-126%*	*-72%*	*-65%*		
Total cost of revenues	$ (1 557 234)	$ (2 316 685)	$ (3 122 522)	$ (5 400 875)	99,4%	152,7%
% of Total Cost Growth	*-306%*	*-49%*	*-35%*	*-73%*		
Gross profit	$ 456 262	$ 881 671	$ 923 503	$ 1 599 257	93,2%	134,7%
As a % of sales	*23%*	*28%*	*23%*	*23%*		
Operating expenses						
Research and development	$ (231 976)	$ (464 700)	$ (717 900)	$ (834 408)	44,2%	134,0%
As a % of Gross Profit	*-51%*	*-53%*	*-78%*	*-52%*		
Selling, general and administrative	$ (285 569)	$ (603 660)	$ (922 232)	$ (1 432 189)	60,2%	154,0%
As a % of Gross Profit	*-63%*	*-68%*	*-100%*	*-90%*		
Total operating expenses	$ (517 545)	$ (1 068 360)	$ (1 640 132)	$ (2 266 597)	52,9%	145,7%
% Growth of Operating Expenses	*-22%*	*-106%*	*-54%*	*-38%*		
Income (loss) from operations (EBIT)	$ (61 283)	$ (186 689)	$ (716 629)	$ (667 340)	-28,7%	-189,1%
% Growth	*84%*	*-205%*	*-284%*	*7%*		
Interest income	$ 189	$ 1 126	$ 1 508	$ 8 530	79,2%	275,2%
% Growth	*-34%*	*496%*	*34%*	*466%*		
Interest expense	$ (32 934)	$ (100 886)	$ (118 851)	$ (198 810)	-141,9%	-140,4%
% Growth	*-12866%*	*-206%*	*-18%*	*-67%*		
Other expense, net	$ 22 602	$ 1 813	$ (41 652)	$ 111 272	260,2%	783,4%
% Growth	*1336%*	*-92%*	*-2397%*	*367%*		
Income (loss) before income taxes (EBT)	$ (71 426)	$ (284 636)	$ (875 624)	$ (746 348)	-30,1%	-161,9%
% Growth of EBT	*82%*	*-299%*	*-208%*	*15%*		
Provision for income taxes	$ (2 588)	$ (9 404)	$ (13 039)	$ (26 698)	131,6%	168,5%
% Growth	*-1803%*	*-263%*	*-39%*	*-105%*		
Taxes (%)	*3,6%*	*3,3%*	*1,5%*	*3,6%*	78,1%	104,1%
Net Income (Loss)	$ (74 014)	$ (294 040)	$ (888 663)	$ (773 046)	-30,8%	-162,1%
% Growth of Net Income (Loss)	*81%*	*-297%*	*-202%*	*13%*		

Appendix K: Forecasted Income Statement

Consolidated Income Statement Forecast	dez/31							
(in thousands, except per share data)	**FY2017**	**FY2018**	**FY2019**	**FY2020**	**FY2021**	**FY2022**	**FY2023**	**FY2024**
Revenues								
Automotive	$ 15 356 352	$ 27 356 261	$ 27 924 399	$ 28 995 153	$ 30 699 306	$ 32 546 539	$ 34 549 503	$ 36 721 973
% Sales Growth	*175%*	*78%*	*2%*	*4%*	*6%*	*6%*	*6%*	*6%*
Automotive leasing	$ 1 535 635	$ 2 735 626	$ 2 792 440	$ 2 899 515	$ 3 069 931	$ 3 254 654	$ 3 454 950	3 672 197,33
% Automotive Sales	*10%*	*10%*	*10%*	*10%*	*10%*	*10%*	*10%*	*10%*
Total automotive revenue	$ 16 891 987	$ 30 091 887	$ 30 716 839	$ 31 894 668	$ 33 769 236	$ 35 801 193	$ 38 004 454	$ 40 394 171
% Automotive Sales Growth	*166%*	*78%*	*2%*	*4%*	*6%*	*6%*	*6%*	*6%*
Energy generation and storage	$ 544 182	$ 816 273	$ 1 224 410	$ 1 836 614	$ 2 112 106	$ 2 428 922	$ 2 793 261	$ 3 212 250
% of Total Automotive Sales	*200%*	*50%*	*50%*	*50%*	*15%*	*15%*	*15%*	*15%*
Services and other	1 351 358,98	2 708 269,82	3 071 683,93	3 508 413,51	4 052 308,35	4 654 155,10	5 320 623,51	6 059 125,60
% of Total Automotive Sales	*8%*	*9%*	*10%*	*11%*	*12%*	*13%*	*14%*	*15%*
Total revenues	$ 18 787 528	$ 33 616 430	$ 35 012 933	$ 37 239 696	$ 39 933 651	$ 42 884 271	$ 46 118 338	$ 49 665 546
% Revenues Growth	*168%*	*79%*	*4%*	*6%*	*7%*	*7%*	*8%*	*8%*
Cost of revenues								
Automotive	$ (11 517 264)	$ (19 149 383)	$ (19 267 836)	$ (19 716 704)	$ (20 568 535)	$ (21 480 716)	$ (22 457 177)	$ (23 869 283)
% Automotive Revenues	*75%*	*70%*	*69%*	*68%*	*67%*	*66%*	*65%*	*65%*
Automotive leasing	$ (921 381)	$ (1 641 376)	$ (1 675 464)	$ (1 739 709)	$ (1 841 958)	$ (1 952 792)	$ (2 072 970)	$ (2 203 318)
% Automotive Leasing	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*	*60%*
Total automotive cost of revenues	$ (12 438 645)	$ (20 790 758)	$ (20 943 300)	$ (21 456 413)	$ (22 410 493)	$ (23 433 508)	$ (24 530 147)	$ (26 072 601)
% Growth	*-162%*	*-67%*	*-1%*	*-2%*	*-4%*	*-5%*	*-5%*	*-6%*
Energy generation and storage	$ (489 764)	$ (693 832)	$ (979 528)	$ (1 377 461)	$ (1 478 474)	$ (1 700 246)	$ (1 955 282)	$ (2 248 575)
% Energy Revenues	*90%*	*85%*	*80%*	*75%*	*70%*	*70%*	*70%*	*70%*
Services and other	$ (1 148 655)	$ (2 166 616)	$ (2 303 763)	$ (2 455 889)	$ (2 634 000)	$ (3 025 201)	$ (3 458 405)	$ (3 938 432)
% Service Revenues	*85%*	*80%*	*75%*	*70%*	*65%*	*65%*	*65%*	*65%*
Total cost of revenues	$ (14 077 064)	$ (23 651 206)	$ (24 226 590)	$ (25 289 763)	$ (26 522 968)	$ (28 158 955)	$ (29 943 835)	$ (32 259 608)
% Growth	*-161%*	*-68%*	*-2%*	*-4%*	*-5%*	*-6%*	*-6%*	*-8%*
Gross profit	$ 4 710 464	$ 9 965 224	$ 10 786 343	$ 11 949 933	$ 13 410 683	$ 14 725 316	$ 16 174 503	$ 17 405 938
As a % of Total Revenues	*25%*	*30%*	*31%*	*32%*	*34%*	*34%*	*35%*	*35%*
Operating expenses								
Research and development	$ (1 668 816)	$ (1 344 657)	$ (1 400 517)	$ (1 489 588)	$ (1 597 346)	$ (1 715 371)	$ (1 844 734)	$ (1 986 622)
As a % of Total Revenues	*9%*	*4%*	*4%*	*4%*	*4%*	*4%*	*4%*	*4%*
Selling, general and administrative	$ (2 864 378)	$ (5 042 464)	$ (4 201 552)	$ (4 468 764)	$ (3 993 365)	$ (4 288 427)	$ (4 611 834)	$ (4 966 555)
As a % of Total Revenues	*15%*	*15%*	*12%*	*12%*	*10%*	*10%*	*10%*	*10%*
Total operating expenses	$ (4 533 194)	$ (6 387 122)	$ (5 602 069)	$ (5 958 351)	$ (5 590 711)	$ (6 003 798)	$ (6 456 567)	$ (6 953 176)
% Growth of Operating Expenses	*-100%*	*-41%*	*12%*	*-6%*	*6%*	*-7%*	*-8%*	*-8%*
Income (loss) from operations (EBIT)	$ 177 270	$ 3 578 102	$ 5 184 273	$ 5 991 581	$ 7 819 972	$ 8 721 518	$ 9 717 935	$ 10 452 762
As a % of Total Revenues	*1%*	*11%*	*15%*	*16%*	*20%*	*20%*	*21%*	*21%*
Interest income	$ 131 513	$ 235 315	$ 245 091	$ 260 678	$ 279 536	$ 300 190	$ 322 828	$ 347 659
% Growth	*0,70%*	*0,70%*	*0,70%*	*0,70%*	*0,70%*	*0,70%*	*0,70%*	*0,70%*
Interest expense	$ (3 757 506)	$ (5 378 629)	$ (4 201 552)	$ (2 979 176)	$ (1 996 683)	$ (2 144 214)	$ (2 305 917)	$ (2 483 277)
% Growth	*-20,00%*	*-16,00%*	*-12,00%*	*-8,00%*	*-5,00%*	*-5,00%*	*-5,00%*	*-5,00%*
Other expense, net	-	-	-	-	-	-	-	-
% Growth	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*	*0,00%*
Income (loss) before income taxes (EBT)	$ (3 448 723)	$ (1 565 212)	$ 1 227 812	$ 3 273 084	$ 6 102 825	$ 6 877 494	$ 7 734 847	$ 8 317 144
% Growth of EBT	*-362%*	*55%*	*178%*	*167%*	*86%*	*13%*	*12%*	*8%*
Provision for income taxes	$ -	$ -	$ 2 627 324	$ (1 309 233)	$ (2 441 130)	$ (2 750 998)	$ (3 093 939)	$ (3 326 857)
% Growth	*- -*		*214%*	*-40%*	*-40%*	*-40%*	*-40%*	*-40%*
Taxes (%)								
Net Income (Loss)	$ (3 448 723)	$ (1 565 212)	$ 3 855 136	$ 1 963 850	$ 3 661 695	$ 4 126 497	$ 4 640 908	$ 4 990 286
% Growth of Net Income (Loss)	*-346%*	*55%*	*346%*	*-49%*	*86%*	*13%*	*12%*	*8%*

Appendix L: The DCF Model

Net Income (Loss)	$ (773 046)	$ (3 448 723)	$ (1 565 212)	$ 3 855 136	$ 1 963 850	$ 3 661 695	$ 4 126 497	$ 4 640 908	$ 4 990 286
Property, plant and equipment, net	$ 5 982 957	$ 14 090 646	$ 25 212 322	$ 26 259 700	$ 27 929 772	$ 29 950 238	$ 32 163 203	$ 34 588 753	$ 37 249 160
% of Total Revenues	*85%*	*75%*	*75%*	*75%*	*75%*	*75%*	*75%*	*75%*	*75%*
Depreciation	$ 477 300	$ 1 268 158	$ 2 269 109	$ 2 363 373	$ 2 513 679	$ 2 695 521	$ 2 894 688	$ 3 112 988	$ 3 352 424
Depreciation as a % of PP&E	*8%*	*9%*	*9%*	*9%*	*9%*	*9%*	*9%*	*9%*	*9%*
Capital Expenditures	$ 3 056 923	$ 9 375 847	$ 13 390 785	$ 3 410 750	$ 4 183 752	$ 4 715 988	$ 5 107 653	$ 5 538 538	$ 6 012 830
% PP&E	*51%*	*67%*	*53%*	*13%*	*15%*	*16%*	*16%*	*16%*	*16%*
Change in NWC	$ 84 505	$ (32 110)	$ (130 953)	$ (149 360)	$ (176 961)	$ (236 361)	$ (139 059)	$ (155 889)	$ (20 594)
EBIT	$ (667 340)	$ 177 270	$ 3 578 102	$ 5 184 273	$ 5 991 581	$ 7 834 665	$ 8 756 046	$ 9 778 801	$ 10 548 147
Tax Rate	*4%*	*0%*	*0%*	*40%*	*40%*	*40%*	*40%*	*40%*	*40%*
EBIT x (1 - t)	$ (643 468)	$ 177 270	$ 3 578 102	$ 3 110 564	$ 3 594 949	$ 4 700 799	$ 5 253 628	$ 5 867 281	$ 6 328 888

DCF Model, in thousands	**2016**	**FY2017**	**FY2018**	**FY2019**	**FY2020**	**FY2021**	**FY2022**	**FY2023**	**FY2024**
FCFF	$ (3 307 596)	$ (7 898 309)	$ (7 412 621)	$ 2 212 546	$ 2 101 837	$ 2 916 694	$ 3 179 722	$ 3 597 619	$ 3 689 076
Discount Factor	1	0,92	0,85	0,78	0,72	0,67	0,61	0,57	16,68
PV of FCFF	$ (3 307 596)	$ (7 279 773)	$ (6 297 081)	$ 1 732 381	$ 1 516 820	$ 1 940 034	$ 1 949 357	$ 2 032 831	$ 61 519 054
Enterprise Value	$ 53 806 028								
Net Debt	$ 3 451 044								
Equity Value	$ 50 354 984								
Number of shares outstanding	156 100 000								
Share Price, USD	$ 322,58								

Appendix M: Inputs for Tax Rate Sensitivity Analysis

Taxes amount for different tax levels

Income and Taxes, in thousands	2017	2018	2019	2020	2021	2022	2023	2024
Income (loss) before income taxes (EBT)	$ (3 448 723)	$ (1 565 212)	$ 1 227 812	$ 3 273 084	$ 6 102 825	$ 6 877 494	$ 7 734 847	$ 8 317 144
Total tax loss carryforwards	$ (6 230 911)	$ (7 796 123)	$ -	$ -	$ -	$ -	$ -	$ -
Taxable Income			$ (6 568 311)	$ 3 273 084	$ 6 102 825	$ 6 877 494	$ 7 734 847	$ 8 317 144
Taxes (15%)			$ (985 247)	$ 490 963	$ 915 424	$ 1 031 624	$ 1 160 227	$ 1 247 572
Taxes (20%)			$ (1 313 662)	$ 654 617	$ 1 220 565	$ 1 375 499	$ 1 546 969	$ 1 663 429
Taxes (25%)			$ (1 642 078)	$ 818 271	$ 1 525 706	$ 1 719 374	$ 1 933 712	$ 2 079 286
Taxes (30%)			$ (1 970 493)	$ 981 925	$ 1 830 847	$ 2 063 248	$ 2 320 454	$ 2 495 143
Taxes (35%)			$ (2 298 909)	$ 1 145 579	$ 2 135 989	$ 2 407 123	$ 2 707 196	$ 2 911 000
Taxes (40%)			$ (2 627 324)	$ 1 309 233	$ 2 441 130	$ 2 750 998	$ 3 093 939	$ 3 326 857

		WACC
Corporate Taxes	15%	8,67%
	20%	8,63%
	25%	8,60%
	30%	8,57%
	35%	8,53%
	40%	8,50%

Appendix N: Investment Note

October 17, 2016 | **Baird Equity Research**
Energy Technology & Resource Management

Tesla Motors Inc. (TSLA)

Q3 Preview and Management Meetings

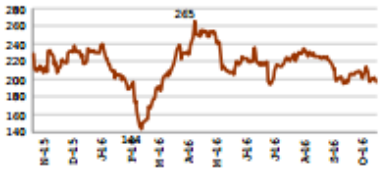
Reiterate Outperform rating after hosting meetings with management. We are constructive heading into Q3 and expect updates on the battery factory construction and ramp on the Q3 call (AMC October 26). We believe the battery factory is on time and ahead of budget. Additionally, we are lowering our 2017 estimates to account for higher expected R&D and a lower expected ASPs. Importantly, this update is not connected to anything heard at management meetings. We continue to recommend shares as upcoming catalysts should drive the stock higher.

- **Our Q3 estimates are above consensus although Street models may not have been updated since the Q3 delivery announcement, and we expect a noisy quarter as TSLA is phasing out non-GAAP metrics.** We estimate non-GAAP revenue of $2,408M vs. consensus of 2,340M, gross margin of 21.0% vs. 22.2%, and EPS of $0.27 vs. $0.06. We will update our model to GAAP after the quarterly results.
- **Battery factory is our biggest focus and from what we can tell is on time and ahead of budget.** Although the battery factory will take several years to reach full capacity, we believe progress updates should be catalysts for the stock. We expect to hear updates on the production ramp and potential full production capacity of the factory on the Q3 call and at the opening event on January 4.
- **Vehicle discounting remains a focus of investors, although we think concerns are overblown and the issue will be cleared up on the Q3 call.** Management explained discounting only occurs on floor models, test drive vehicles, and loaners (for repairs), and the company does not discount new vehicles produced at the factory. We believe concerns over discounting will dissipate on the Q3 report when we see TSLA's automotive gross margin.
- **Lowering 2017 estimates to account for higher expected R&D and lower expected ASPs.** We are lowering our estimates as we update our model, not as a result of information learned at management meetings. Additionally, there is a wide range in estimates. We now expect revenue of $12.510B and EPS of $2.59 vs. our previous estimates of $12.756B and $3.83, respectively.
- **We continue to recommend shares as we believe upcoming catalysts should drive the stock higher.** Importantly, TSLA indicated it will unveil a new product Wednesday, October 19 (pushed back). Product possibilities include enhancements to the S/X, energy storage products, or showing of a different class of vehicle. Other upcoming events/potential catalysts are listed in the details section.

Tesla develops, manufactures, and sells electric vehicles as well as batteries for energy storage.

ESTIMATE CHANGE

1-Year Price Chart



Stock Data

Rating:	Outperform
Suitability:	Higher Risk
Price Target:	$338
Price (10/14/16):	$196.51
Market Cap (mil):	$30,675
Shares Out (mil):	156.1
Average Daily Vol (mil):	3.10
Dividend Yield:	0.0%

Estimates

FY Dec	2015A	2016E	2017E
Q1	(0.36) A	(0.57) A	
Q2	(0.48) A	(1.06) A	
Q3	(0.58) A	0.27 E	
Q4	(0.87) A	0.86 E	
Fiscal EPS	**(2.30) A**	**(0.50) E**	**2.59 E**
Previous Est		(0.41) E	3.83 E
Fiscal P/E			

Chart/Table Sources: FactSet and Baird Data. Price chart reflects most recent closing price.

Please refer to Appendix - Important Disclosures and Analyst Certification

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Details

Upcoming events/potential catalysts include:

- October 19: TSLA product release
- October 26: Q3 earnings release
- October 28: TSLA/SCTY solar roof release
- November 17: Shareholder vote for SCTY/TSLA merger
- January 4: Gigafactory Tour in Reno
- July, 2017: Model 3 production expected to begin
- TBD: Additional details about the Model 3 and potential introduction of the Model Y/additional products.

Cash burn should decrease as production increases and SCTY business model evolves, and new sources of capital should become available over time. Investors remain concerned about TSLA potentially tapping the debt and/or equity markets and the cash needs of SCTY. We believe the SCTY business model will evolve to incorporate a much higher percentage of loans and cash sales, requiring significantly less upfront capital and supporting a transition to a cash flow positive business, which should help ease concerns about TSLA's capital needs. Additionally, we expect an update on the Silevo facility on the upcoming conference call.

TSLA continues to take market share in North America. The strong volume of Model X deliveries during Q3 show it is outselling the Porsche Cayenne and Macan in North America (although it is difficult to compare apples to apples because of backlog).

Q3 call will be held on October 26 at 4:30 p.m. CT and can be accessed at http://ir.tesla.com.

Investment Thesis

Model S provides a luxury electric vehicle with triple the range of many of its competitors. TSLA began delivering the Model S, a four-door premium sedan, in June 2012. It is the first fully electric, luxury car model to hit the market and boasts an impressive range of ~270+ miles (depending on model), which is ~2x the range of its closest EV competitor.

Long-term growth is intact and Model X vehicle production continues to ramp. We believe the Model X rollout will increase brand value significantly and think the responses to the X from early customers will be positive and accelerate sales.

Model III should outperform competitors, providing a fully electric vehicle at a competitive price. TSLA's Model III vehicles are expected to compete with the Audi A4 and BMW 3 Series, which both range in cost from ~$32k for a base model to ~$53k fully loaded. Model III vehicles will begin at an ASP of $35,000, but we think TSLA will offer models for higher prices that carry greater than a 215 mile range. We expect the performance of the Gen III models to exceed the A4 and BMW 3 Series. Our model assumes deliveries in 2018.

Tesla Energy storage solutions Powerwall and Powerpack will contribute to revenue in 2016+. The Gigafactory will be a significant catalyst, lowering TSLA's costs of production as well as diversifying revenue. Musk has noted TSLA Energy could sell $400-$500M of storage systems in 2016 and "a few billion" in 2017 (we model $500M).

Gigafactory will bring TSLA one step closer to making Model III a reality and creates a significant barrier for competition. To date, TSLA has brought innovation to auto production and reinvented the downstream market with direct-to-consumer sales. TSLA now seeks to reinvent the

upstream market through cell and battery pack production, and we believe TSLA could drive down costs through an industrialization of battery pack assembly and economies of scale. We think Panasonic's partnership could increase production efficiency and lower costs.

We believe several upcoming catalysts could drive the stock price higher. We think demand for the Model S will remain strong throughout 2016 in the U.S. and Europe. Additionally, TSLA has several significant milestones coming up over the next 18 months. Upcoming catalysts include: (1) ramp of Model X production; (2) additional details about the Model III; (3) expansion of production capacity for both TSLA auto and TSLA Energy; and (4) construction milestones at TSLA's cell/battery factory.

$338 price target. Based on a P/E multiple of ~31x on our 2020 EPS estimate of ~$23 discounted to YE:16 at a 20% discount rate. This is in line with other category creators, which are currently trading at a P/E range of ~26x-358x and a median of 36x.

Risks & Caveats

Dependence on single-source suppliers for key automotive parts. A number of the component parts used in TSLA's designs come from single-source manufacturers. The company has not identified/qualified alternative sources for many of these parts and does not as a typical practice enter into long-term supply agreements. As a result, a disruption of its supply chain could negatively impact Tesla's ability to deliver its product.

Slow or limited adoption of electric vehicles. TSLA's technology is attempting to create a niche in the automotive market by displacing incumbent combustion-engine vehicles. A slow or lack of adoption by customers of these vehicles due to performance/safety concerns, range anxiety, or oil price decrease would jeopardize the TSLA's growth plans.

Limited advances in battery technology. The launch of low cost Gen III vehicles relies on the ability to reduce battery costs. If TSLA is unable to significantly reduce battery costs through economies of scale or technological advances it may prove challenging to produce vehicles at the $35,000 price point without reductions in performance.

Challenging economic environment reduces automobile demand. The economic downturn in 2008 put tremendous pressure on vehicle manufacturers with both General Motors and Chrysler being forced to file for bankruptcy. Tesla's premium vehicle offerings have relatively high ASPs with the ~275 mile per charge version of the Model S starting at ~$62,500 after tax credits, and the performance variation at $97,500. Prolonged economic challenges or a reversion of the economy back into a recessionary state could negatively impact consumer discretionary income and reduce demand for automobiles.

Company Description

Tesla develops, manufactures, and sells battery electric vehicles as well as advanced powertrain components. The company released its first model, the Tesla Roadster, in early 2008 and has since commercialized its first completely in-house designed vehicle, the Model S, released the Model X in 2015, and will begin Model III shipments in late 2017. We estimate TSLA will deliver ~80k vehicles in 2016, and ~125k in 2017.