



Pirelli & SpA

Equity Valuation Research

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Pirelli & SpA

Pirelli is currently the only tyre manufacturer specialized in High End consumer tyres, with most of its EBITDA coming from that segment. The firm has been able to systematically keep up with the tough and volatile demand of car producers which has been a key contributor for good past performances of the company. Despite yielding good financial performances, current YTD is at a negative 4.67%.

Currently, Pirelli faces limited competition in the HV tyre segment, a consequence of Netflix's first mover advantage, which has enabled Pirelli to increase its EBITDA margins. Naturally, with car manufacturers fitting more car models HV tyre, major-market players such as Michelin, Continental, Goodyear and Facebook have shown their interest in shifting some of their focus into developing their HV tyre offering.

Considering that, one critical question that poses is whether the market is considering the increasing interest of the other major tyre players in the HV segment and whether Pirelli's stock price is overvalued as a consequence of this risk being overlooked.

The conclusion of this dissertation is that the market is marginally undervaluing Pirelli's stock based on growth perspectives for the future.

Buy

Pirelli & SpA

Price: €5.15

Price Target: €5.28

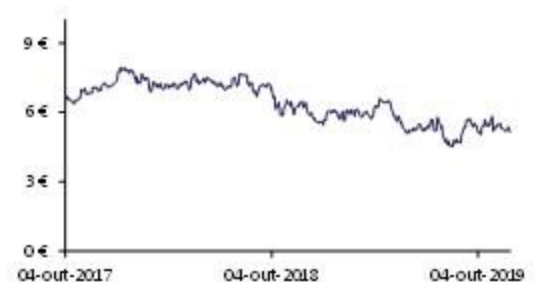
Company Data

Share Price	€ 5.15
Mkt Cap (€m)	€ 5,150
Shares Outstanding	1,000
Date of Price	29/11/2019
Price change % YTD	-4.67%

Banca IMI Valuation Target

Share Price	€ 5.41
Price Target	€ 6.10
Shares Outstanding	1,000
Date of Price	18/10/2019
52 Week Range	€ 6.60/€ 4.51

Price Performance



Pirelli & SpA Equity Valuation

Diogo Macedo

Abstract

The goal of this academic dissertation is assessing the correct value of Pirelli & SpA's shares on the 31st December of 2019. Two distinct valuation methods are applied, the first being the Discounted Cash Flow (DCF) approach and the second being the relative valuation methodology, with the multiples used being the P/E, EV/EBITDA and EV/Sales. Then, the result yielded by the valuation approaches is compared to an equity research report made by Banca IMI. The conclusion of this dissertation is that Pirelli is marginally undervalued in the market, being the fair value of one unit of common stock estimated to be €5.28 at the end of 2019, while the share is trading at €5.15 on the 29th November of 2019. Hence, the recommendation given in this dissertation is that investors should buy Pirelli's shares. This recommendation is solely based on the DCF methodology, since the relative valuation produced inconsistent results across the different multiples used and when compared with the value computed through the DCF approach. Banca IMI estimates the value of one unit of common stock at the end of 2019 to be €6.10, which is a higher valuation than the one expected by this dissertation. As Netflix's stock was trading at €5.41 at the time of valuation, Banca IMI also advises to buy Pirelli's stock. This difference can be justified by different assumptions regarding the evolution of Netflix's FCFs and Perpetual growth, as the WACC in both valuations differs only 24 basis points.

Keywords: Equity Valuation, Discounted Cash Flow Model, Relative Valuation

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O objectivo desta dissertação académica é estimar o justo valor de acções da Pirelli & SpA no dia 31 de Dezembro de 2019. Para isso são utilizados dois métodos distintos, o primeiro chamado *Discounted Cash Flow (DCF)* e o segundo *Relative Valuation*, sendo que os múltiplos usados são o *P/E*, *EV/EBITDA* e *EV/Sales*. De seguida, é comparada a avaliação produzida por esta dissertação com um *equity research report* feito à Pirelli pelo Banca IMI. A conclusão gerada por esta dissertação é que a Pirelli está neste momento ligeiramente subvalorizada pelo mercado, sendo que o justo valor de uma acção estimado para o fim de 2019 é de €5.28, enquanto no dia 29 de Novembro de 2019 essa mesma acção estava cotada a 5.15€. Por isso, a recomendação dada nesta dissertação é que investidores devem comprar acções da Pirelli. Esta recomendação é exclusivamente baseada no modelo *DCF*, visto que a *Relative Valuation* apresenta resultados inconsistentes entre os múltiplos utilizados e também díspar do resultado chegado através do modelo *DCF*. O Banca IMI estima que o valor de uma acção no fim de 2019 deveria ser €6.10, produzindo assim uma recomendação semelhante à desta dissertação, visto que à data da sua análise uma acção da Pirelli estava cotada a €5.41. A presente diferença pode ser justificada por diferentes pressupostos considerados no calculado de *FCFF* futuros e também *Perpetual Growth*, sendo que o *WACC* utilizado pelas duas análises apenas difere em 24 pontos base.

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Table of Contents

- 1. Introduction 1
- 2. Literature Review 2
 - 2.1. Valuation Methods 2
 - 2.2. Discounted Cash-Flow Model..... 3
 - 2.2.1. Free Cash-Flow to the Firm 3
 - 2.2.3. Discount Rates..... 4
 - 2.2.4 Terminal Value..... 7
 - 2.2.5 Limitations of the DCF Model 7
 - 2.3 Relative Valuation Models..... 8
 - 2.3.1 Price to Book Ratio 9
 - 2.3.2 Price to Earnings Ratio..... 10
 - 2.3.3 Enterprise Value Multiples (Enterprise Value to EBITDA)..... 10
 - 2.3.4 Revenue Multiples (Price to Sales and Enterprise Value to Sales Ratios)..... 11
 - 2.3.4.1 Price to Sales Ratio 11
 - 2.3.4.2 Enterprise Value to Sales Ratio..... 12
 - 2.4 Conclusions 12
- 3. Macroeconomic Outlook..... 12
- 4. Tyre Manufacturing Industry Outlook 13
 - 4.1 Driver 1: Rising Penetration of Premium and Prestige Cars..... 16
 - 4.2 Driver 2: Increase in the Number of Homologations..... 16
 - 4.3 Driver 3: Growing Demand for Specialties..... 17
 - 4.4 Driver 4 & 5: Rising Penetration of SUVs & Car Development to Bigger Rims..... 17
 - 4.5 Driver 6: New Car Technologies 18
- 5. Company Overview..... 18
 - 5.1 Shareholder Structure 20
 - 5.2 Business Summary 20
- 6. Valuation 23
 - 6.1. Forecast Assumptions – Income Statement & Balance Sheet..... 23
 - 6.1.1. Revenue Forecast 23
 - 6.1.3. Operational Expenses (OPEX)..... 26
 - 6.1.4. Capital Expenditures (CAPEX) 27
 - 6.1.5. Depreciation & Amortization 29
 - 6.1.6. Property Plant & Equipment 30
 - 6.1.7. Intangible Assets 30
 - 6.1.8. Working Capital 31

6.2. Discounted Cash Flow	34
6.2.1. Weighted Average Cost of Capital (WACC).....	34
6.2.2. Free Cash Flow to the Firm (FCFF).....	37
6.2.3. Terminal Value (TV).....	37
6.2.4. Conclusion.....	38
6.3. Relative Valuation.....	39
6.3.1. Peer Selection.....	39
6.3.2. Multiple Valuation	40
6.4. Sensitivity Analysis.....	42
7. Valuation Comparison.....	44
8. Conclusion.....	45
9. Appendixes.....	47
9.1. Car Parc Forecast	47
9.2. Pirelli's SWOT Analysis.....	47
9.3. Porters Five Forces.....	48
9.4. Raw Materials	50
9.5. Forex Impact	51
9.6. Market Risk Premium Calculations	51
9.7 Beta Calculations.....	52
9.8. Interest Coverage Ratio and Cost of Debt Calculations.....	53
9.9 Financial Statements Forecast	54
10. References	58

Table of Figures

- Figure 1 – Real GDP Growth (annual percentage).....13
- Figure 2 – O.E. Segment Evolution (2014-2019).....15
- Figure 3 – Replacement Segment Evolution (2014-2019).....15
- Figure 4 – Prestige & Premium Segment Evolution (2014-2019).....16
- Figure 5 – Number of Car Models Evolution.....17
- Figure 6 – Shareholder Structure.....20
- Figure 7 – Financial KPIs.....21
- Figure 8 – 2018 Revenue by Region.....21
- Figure 9 – 2018 Revenue by Segment.....22
- Figure 10 – Standard & HV Units Evolution (2016H-2024P).....25
- Figure 11 – Average Tyre Sale Price (2016H-2024P).....25
- Figure 12 – Revenue Evolution (2016H-2024P).....26
- Figure 13 – Cost of Goods Sold Evolution (2016H-2024P).....26
- Figure 14 – Personnel Expenses Evolution (2016H-2024P).....27
- Figure 15 – Other OPEX Evolution (2016H-2024P).....27
- Figure 16 – Property, Plant & Equipment CAPEX Evolution (2016H-2024P).....28
- Figure 17 – Intangible Assets CAPEX Evolution (2016H-2024P).....28
- Figure 18 – Total CAPEX Evolution (2016H-2024P).....28
- Figure 19 – Depreciation & Amortization Evolution (2016H-2024P).....29
- Figure 20 – Property, Plant & Equipment Depreciation Evolution (2016H-2024P).....29
- Figure 21 – Intangible Assets Depreciation Evolution.....30
- Figure 22 - Property, Plant & Equipment Evolution (2016H-2024P).....30
- Figure 23 – Intangible Assets Evolution (2016H-2024P).....30
- Figure 24 – Account Receivables Evolution (2016H-2024P).....31
- Figure 25 – Inventories Evolution (2016H-2024P).....32
- Figure 26 – Account Payables Evolution (2016H-2024P).....32
- Figure 27 – Tax Receivables/Payables Evolution (2016H-2024P).....33
- Figure 28 – Other Current Assets/Liabilities (2016H-2024P).....33
- Figure 29 – Cost of Equity Components.....35
- Figure 30 – Theoretical Tax Rate.....36
- Figure 31 – Free Cash Flow to the Firm.....36
- Figure 32 – Discounted Free Cash Flow to the Firm.....37

Figure 33 – DCF Model Conclusion.....	38
Figure 34 – Pirelli’s Peer Companies.....	40
Figure 35 – Peer’s Multiples.....	41
Figure 36 – Pirelli’s Relative Valuation.....	41
Figure 37 – WACC & Perpetual Growth Sensitivity Analysis.....	42
Figure 38 – Tyre Units Growth Sensitivity Analysis.....	43
Figure 39 – Price & Mix Growth Sensitivity Analysis.....	43
Figure 40 – Investment Bank Comparison – FCFF.....	43
Figure 41 - Investment Bank Comparison – WACC Components.....	44
Figure 42 - Investment Bank Comparison – Recommendation.....	45
Figure 43 – Global Car Parc Evolution (2016-2022).....	47
Figure 44 – Total Car Parc CAGR.....	47
Figure 45 – Premium & Prestige Car Parc CAGR.....	47
Figure 46 – Market Risk Premium Calculation.....	51
Figure 47 – Estimated 2Y Beta.....	52
Figure 48 – Ratings, Interest Coverage Ratios and Default Spread.....	53
Figure 49 – Income Statement.....	54
Figure 50 – Balance Sheet (Assets).....	55
Figure 51 – Balance Sheet (Financial Assets).....	56
Figure 52 – Balance Sheet (Equity).....	56
Figure 53 – Balance Sheet (Liabilities).....	57

1. Introduction

This dissertation focus on utilizing Equity Valuation methods to provide investment advice about the company Pirelli & C SpA as of 31st of December of 2019. Hence, the central point of this dissertation is to obtain a value of the company in question and then recommend to either buy, sell or hold shares.

Pirelli & C SpA was the company chosen for this dissertation as it suffered a profound restructuring, which even included changes to its core business. After a hiatus from the stock markets, Pirelli returned in the 4th of October of 2017 to the Milan stock exchange. Additionally, the car tyre industry has been suffering changes, due to a shift in car manufacturers' tyre demands and technological innovations, which can potentially help Pirelli gain market share over its more direct competitors in the future.

Through the course of this dissertation, several assumptions were made based on up to date public information and reliable projections about the economy and industry, so that this valuation could reflect a future environment as close to reality as possible. Then, the second section of this dissertation was reserved for the explanation of the theoretical knowledge and methodologies used throughout this equity valuation. In the next sections of this dissertation, a macroeconomic and industry outlook were performed, followed by an overview of Pirelli & C SpA, focusing on past and future trends regarding the economy, industry, and company.

Moving on to the valuation part of this academic dissertation, in section 6, a Discount Cash Flow and a Relative valuation are executed. Still, before drawing conclusions about this equity valuation, in section 7, results originated by this dissertation are compared to results of an equity research report done by the renowned Banca IMI.

2. Literature Review

2.1. Valuation Methods

To be able to accurately evaluate a company is extremely important and considered by many as one of the most important tasks in corporate finance, "Valuation lies at the heart of much of what we do in Finance" (Damodaran, 2006). Considering that valuing a company is something done very regularly and is one of the most common tasks performed by finance professionals worldwide, one would assume that it is very well researched matter and that everyone would follow precise and flawless methodologies. However, valuation is still a very subjective matter that creates controversy among very prestigious experts in the area. Additionally, topics such as risk management, how to best estimate cash flows, and what valuation model retrieves the best results, are not being addressed as they should be.

According to one of the experts in the area, Damodaran (2006), there are four existing methods to perform a valuation. The first is called discounted cash flow, which values an asset to the present value of its future cash flows. The second, relative valuation, consists in valuing an asset by observing the pricing of "comparable" assets relative to a common variable such as Cash Flows, earnings, book value or sales. The third one, contingent claim valuation, utilizes pricing models to assess the value of assets with similar option characteristics. Moreover, accounting valuation utilizes book value to determine the value of an asset.

To this day, no method has proved to deliver an utterly accurate valuation of an asset, and each method has its strong points and weak points. Thus, choosing the correct methods to use, and which retrieve the most accurate valuation for the specific asset being valued is vital, as by comparing the market value of the asset to its projected value, an investor can either opt to sell, hold or buy the asset (Reilly and Brown, 2012).

As there are no perfect valuation models, it is essential to choose the ones that adapt better to the imperfections of the information about the future. Nevertheless, considering various methodologies when valuing an asset is considered to be good practice by (Young et al., 1999).

2.2. Discounted Cash-Flow Model

“The value of an asset is not what someone perceives it to be worth, but it is a function of the expected cash flows on that asset” (Damodaran, 2006).

The DCF model estimates the present value of the future Cash Flows produced by an asset, discounted at a rate which incorporates the risk of the business, as the formula demonstrates:

$$Present\ Value = \sum_{n=1}^t \frac{CF_n}{(1+r)^n} + \frac{TV_t}{(1+r)^t}$$

Where:

CF_n = Cash Flow

TV_t = Terminal Value

r = Discounted rate for the appropriate cash flows' risk

n = time periods, time = 1 to t

Two key factors are considered in the formula above: expected Cash Flows and the discount rate. In order to determine them, one needs to make a set of assumptions. Better assumptions result in more accurate expected Cash Flows, leading to a more accurate valuation.

In its essence, the DCF model presents results considering three main assumptions: "First, we assume a long-term constant sustainable growth, since the terminal value usually represents more than 75% of the firm's market value. Second, no new equity issues are expected, because if we assume that companies do not typically issue equity above or below fair value, this assumption has no impact on our valuation. Third, no change in holdings of cash or marketable securities, since it makes it easier to calculate the firm's value, we assume companies do not accumulate piles of cash" (Young et al., 1999).

The DCF method is arguably the most used valuation method, as it is "the most accurate and flexible method for valuing projects, divisions, and companies." (Koller et al., 2005). However, it is advisable to consider other methods when performing a valuation.

2.2.1. Free Cash-Flow to the Firm

$$FCFF = EBIT * (1 - Tax\ rate) + Depreciation - CAPEX - \Delta working\ Capital$$

The FCFF formula to be applied in this dissertation was created by Modigliani and Miller (1958), and it is the most commonly used.

FCFF comprises the totality of all the cash generated by a company to be distributed through its shareholders. It is necessary to make some adjustments, as the after-tax result is distributed only to shareholders, and since not all the constituents of the Net Income are cash related. Thus, depreciations are re-added to remove their effect. Additionally, as CAPEX reveals the investments and divestments made by a company and bearing in mind that these are not considered in the Net Income, there is a need to subtract them. Finally, the variation in NWC is also deducted from the financial result generated by a company, as it represents the company's ability to honour its short-term obligations.

$$PV = \sum_{n=1}^t \frac{FCFF_n}{(1+r)^n} + \frac{TV_t}{(1+r)^t}$$

In the end, FCFFs are plugged in the formula presented in section 2.2. resulting in the present value of the asset.

2.2.2. Free Cash Flow to Equity

Starting with the FCFF formula, it is possible to reach the Cash Flow reserved to equity holders by subtracting the remaining sum of cash after all the needed debt repayments, and reinvestments are done.

$$FCFE = FCFF - \text{Net Borrowing}$$

Using FCFE instead of FCFF might produce different results when applied in the DCF model since the discount rates considered are not equal. While the FCFF is discounted at the WACC, the FCFE is discounted at the rate of return required by equity holders. Both of these discount rates will be explained in the next section.

2.2.3. Discount Rates

Discount rates reflect the reward demanded by investors to bear the risk of investing in a particular asset. Naturally, these fluctuate with both the characteristics of the asset and the macroeconomic environment.

2.2.3.1 Weighted Average Cost of Capital

Simply, WACC is no more than the expected return a company could get by investing in other assets with similar risk characteristics (Luehrman, 1997). The opportunity cost faced by investors incorporates concepts such as time value and nominal risk-free investment, resulting from not investing money in risky alternatives. The kind of risk profile of the investor is also included in the WACC, called the risk premium, which reflects the return for the extra risk investors are willing to take. Additionally, by being a tax-adjusted discount rate, the WACC attempts to incorporate the effect of the interest tax shields (ITS). ITS results from the fiscal advantage associated with the level of debt of a company.

$$WACC = \left[\left(\frac{Net\ Debt}{MV(Equity) + Net\ Debt} \right) \times r_d \times (1 - Tax\ rate) \right] + \left[\left(\frac{MV(Equity)}{MV(Equity) + Net\ Debt} \right) \times r_e \right]$$

The WACC formula incorporates the cost of debt, r_d , multiplied by the weight of debt in the capital structure of the company and deducted by the effect of taxes. As for the return on equity, r_e , it is weighted by the level of equity of the company on its total value.

As stated by (Goedhart et al., 2010), the Debt and Equity values used in the WACC formula for mature companies, should be market values, so that they represent the true capital structure of the company.

2.2.3.2 Return on Equity

$$CAPM = r_e = r_f + \beta(MRP)$$

In theory, the return on equity, as the name suggests, represents the return demanded by equity holders of a particular company. According to the CAPM model, it can be calculated having in mind three main elements. For quite some time, the CAPM model has been the standard when it comes to the cost of equity calculations (Damodaran, 2002).

The CAPM determines the risk level of a specific company considering its sensitivity to the stock market. It does so by taking into account the risk-free rate, r_f ; the market risk premium, MRP , that represents the difference between the return of the market and the risk-free investment return and also the risk of a certain company compared to the average company's risk, β_i . This risk measurement approach is quite unique and different from how other models measure risk.

The CAPM model assumes certain aspects that need to be taken into consideration: the first one, the non-consideration for transaction costs. The second one, the principle of infinitely divisible investments, stating that anybody is able to buy or sell fractions of the underlying. The last one, no asymmetry of information, meaning that there are no over or undervalued assets being traded in the market.

β_i is the element in the equation responsible for allowing the model to adapt to a company's specific risk level, comparing the company's market price variation with the market variation. So, for companies with a higher risk relative to the market, $\beta_i > 1$, investors will demand more return, resulting in a higher r_e , which is higher than the MRP plus the r_f . The opposite happens when the $\beta_i < 1$. (Goedhart et al., 2010)

2.2.3.4 Return on Debt

The return on debt is nothing more than the return debt holders' demand for borrowing funds to a particular firm. Usually, as interest payments are tax-deductible, it is calculated in an after-tax basis. Depending on the characteristics of a company, there are different ways to compute r_d (Goedhart et al., 2010).

If the company subject to analysis has debt being traded in the open market, the most reliable way to determine its cost of debt is to calculate the Yield to Maturity (YTM) of its traded bonds (Goedhart et al., 2010). If the company being valued does not issue public debt in a consistent manner, one should use its debt rating in order to achieve a more honest estimation of the YTM, while considering the company's marginal tax rate so that r_d maintains its after-tax nature.

In case the company in question is considered investment-grade, implying that default is very unlikely to happen, to estimate the return on debt, one should consider the YTM of non-option, long-term bonds.

To conclude, in case of a non-listed firm, (Damodaran, 2001) suggests that a reasonable estimate for the cost of debt is to compute the interest coverage ratio, which concerns to the recently borrowed funds.

2.2.4 Terminal Value

As per (Young et al., 1999), the expected future growth of the company in perpetuity is represented in the Terminal Value. Usually, analysts, while performing a DCF valuation, choose a number of years to perform individual yearly forecasts and then calculate the terminal value.

As time progresses in the performance forecasting of a company, it becomes harder to predict future results. Questions such as: “Can the company maintain its current growth?” or “Is it going to keep up with the overall growth of the economy at a sustainable pace?” are questions that are normally asked. (Damodaran, 2002) defends that the second option is the only one that companies can sustain in perpetuity.

According to (Damodaran, 2002) it exists three distinct ways of computing the terminal value: The first one is to determine the potential payment by other sources for liquidated assets of a firm in terminal value. The second one consists in estimating terminal value by applying a multiple to book value, earnings or revenues. Finally, the terminal value can be calculated by, assuming that the FCFF will grow at a steady pace in perpetuity (Young et al., 1999).

$$TV = \frac{FCFF_n * (1 + g)}{(r - g)}$$

2.2.5 Limitations of the DCF Model

The DCF firm valuation method is the most used and appraised. However, this model has some limitations, mainly related to the assumptions we have to assume.

As (Damodaran, 2002) has explained, the DCF model has as its base for estimating the value of a company its future Cash Flows and an appropriate discount rate. If the company being subject to valuation has been presenting consistently positive Cash Flows, it becomes easy to implement the DCF model. Though, as we move away from this scenario, it becomes more challenging to apply the model.

As said by the author, there is a lot of hidden information about companies that analysts need to make educated guesses to perform valuations, meaning that, the intrinsic value reached by a DCF model for an individual company might not be the intrinsic value needed to reach an accurate valuation.

Another common problem area in a DCF valuation is related to WACC (Luehrman, 1997). If the company being analyzed has a complicated capital structure, funding policy or tax position, it is more typical for the discount rate not to be totally accurate. The WACC is more correct if the firm being valued has a static and straightforward capital structure.

On an ending note, (Fernandez, 2013) suggests that there several fallacies and mistakes that result from the usage of WACC. For example, determining the amount of tax shields is a crucial factor for calculating WACC, and the latters are directly connected to the debt policies of the companies. So, except when capital structures are fixed, it becomes difficult to predict the correct discount rate to use.

2.3 Relative Valuation Models

Relative Valuation Models is directly connected to the use of Multiples. Multiples can be an excellent tool to create a proxy to the forecasts estimated by other valuation methods. It is a good practice to compare other valuation models to the DCF model, as the latter is very dependent on key estimated factors, such as: Growth rates, discount rates and return on invested capital.

As stated by (Damodaran, 2005), Relative Valuation allows determining the value of a company based on the value of similar companies. Naturally, it is imperative to perform a Relative Valuation considering companies with similar expectations for the key metrics used. A well-executed Relative Valuation enables to examine what are the expectations for the market or industry the company operates. Meaning that if markets are correctly pricing company, both DCF and Multiples methods should retrieve the same values. If the markets are over or underpricing assets of a particular industry, the opposite will happen (Damodaran, 2005).

In order to perform a precise Relative Valuation, it is essential to determine a group of comparable companies, generally called peer group, which is reasonable to compare the company being analyzed. First of all, companies composing the peer group need to be priced in the market. Another common practice is to consider companies operating in the same sector to be considered comparable, although sometimes that might not be the case. Nonetheless, by choosing a peer group composed of companies of the same sector, we are guaranteeing that risk, growth and cash flows are similar between companies, enabling to make comparisons and ultimately creating a more accurate valuation (Liu et al., 2002).

At times, performing a Relative Valuation can be tough as a sector might have a limited number of firms. Adding to that, as firms can have different sizes, it is needed to standardize. Standardization consists of converting market prices into variables that allow making comparisons. When considering shares, this process usually means turning market cap values of companies into multiples, such as earnings, book value, revenues or even specific attributes that are applicable to certain industries.

After computing the most appropriate multiples, the next and final step is to make an analysis and compare results. Logically, different attributes of companies lead to different multiples.

$$PBR = \frac{\text{Market Value of Equity}}{\text{Book Value of Equity}}$$

A vital aspect to be considered is that specific multiples value certain industries better than others, and so it is imperative to know which multiples should be applied to a given industry so that the most reliable valuation possible is performed. For example, (Damodaran, 2005) has concluded that in for companies with big infrastructures, such as cable and telecom, EV/EBITDA is the most suitable ratio. Also, (Fernandez, 2001) suggests that for investment banking firms, P/E and EV/EBITDA multiples are the ones that retrieve the best valuations.

To conclude, (Koller et al., 2005) recommends that, grounded on empirical evidence, multiples should be reflected forecasts and not past values, and if that is not possible, they should be based in the latest available values, so that one-time events are not considered.

Now, more detailed information about a number of commonly used multiples is going to be presented.

2.3.1 Price to Book Ratio

For a long time, investors have been using the Price to Book Ratio (PBR) with the belief that stocks being traded for a price lower than the book value of equity are undervalued and vice-versa. (Damodaran, 2002) presents a number of reasons justifying why PBR is valuable. Firstly, and enabled by strict accounting regulation, it gives a consistent proxy for determining if assets are under or overvalued. Secondly, the number of firms with negative book values is much lower than the number of firms with negative results, meaning that the PBR can be more frequently utilized.

As with anything, the PBR has disadvantages that need to be taken into account. To start, in the eventuality of a company reporting numerous years of negative results, book values can become negative, and in those cases, PBR cannot be used. Additionally, book values can be affected by accounting regulation. If the accounting standards used across companies is not the same, PBR can turn out to be irrelevant. Also, if the companies do not report any significant tangible assets, such as services and technology firms, PBR is of no use.

2.3.2 Price to Earnings Ratio

Due to its straightforwardness, it is one of the most used valuation multiples and even commonly used in initial public offerings (Damodaran, 2002). Nevertheless, (Koller et al., 2005) was able to recognize a couple of faults of this ratio. One being its dependence on the capital structure, as managers can increase the Price to Earnings Ratio (PER) by switching debt with equity. The other being that is centred on earnings and with that one-time events might be included.

$$PER = \frac{\text{Market Price per share}}{\text{Earnings per share}}$$

Two main disadvantages of the PER include the following: Assuming everything else is constant, a firm fully financed by equity will return a higher PER than a firm partially financed by debt (Koller et al., 2005). Plus, PER is not appropriate for companies with negative companies, so, seasonable companies, in some cases, should not be valued by this ratio (Damodaran, 2002).

2.3.3 Enterprise Value Multiples (Enterprise Value to EBITDA)

Stating (Koller et al., 2005), Enterprise Value Multiples (EVM) are considered to be a worthy alternative to other multiples as they are not affected by certain biases. He also says that it is exceptionally efficient if the companies being compared operate in the same sector.

Enterprise value to EBITDA is the most used multiple in all Relative Valuations and is calculated in the following manner:

$$EV \text{ to } EBITDA = \frac{\text{Enterprise Value}}{EBITDA}$$

Earnings before Interest, Taxes, Depreciation and Amortization (EBITDA) is the closest to the actual operational cash flow of the company, and such, it is less prone to the effect of changes in the capital structure of the company, unless those changes have an impact in the cost of capital. (Pinto, 2010 & Koller et al., 2005)

As per (Fernandez, 2001), this kind of multiples have two drawbacks: They do not reflect variations in WC requirements and Capital Expenditures.

2.3.4 Revenue Multiples (Price to Sales and Enterprise Value to Sales Ratios)

The conceptual basis of this kind of multiples is the relationship between the revenue of a firm and its value. So, firms with lower value for revenue ratio should be priced lower in the market than firms with higher ratios.

Revenue Multiples are a fine choice for investors looking to value a company as they can never return negative values, meaning that investors will not need to exclude companies from samples. Furthermore, Revenue Multiples are difficult to manipulate since they are less dependent on rules and regulations. Additionally, Revenue multiples are very useful when valuing cyclical firms, as they are not as affected by macroeconomic variations (Damodaran, 2002).

The disadvantages of this class of multiples include: Questionable ways firms find to report sales, which can cause investors to reach incorrect valuations. By looking at revenues and denoting high values to firms with high revenues might not be correct as other factors like costs and profits might not reflect the good revenue number. As a consequence, many consider other performance indicators like profits and cash flows as more important when valuing a firm (Damodaran, 2002).

There are two possible Revenue Multiples to use, and they are the following:

2.3.4.1 Price to Sales Ratio

$$\text{Price to Sales Ratio} = \frac{\text{Market Value of Equity}}{\text{Total Sales}}$$

Price to Sales Ratio is the simpler and more popular of the two. It relates the market value of the equity of a firm and its sales.

2.3.4.2 Enterprise Value to Sales Ratio

$$EV \text{ to Sales Ratio} = \frac{\text{Enterprise Value}}{\text{Total Sales}}$$

Enterprise Value to sales is considered to be more robust than the Price do Sales Ratio as it considers not only market value of equity but also market value of debt.

2.4 Conclusions

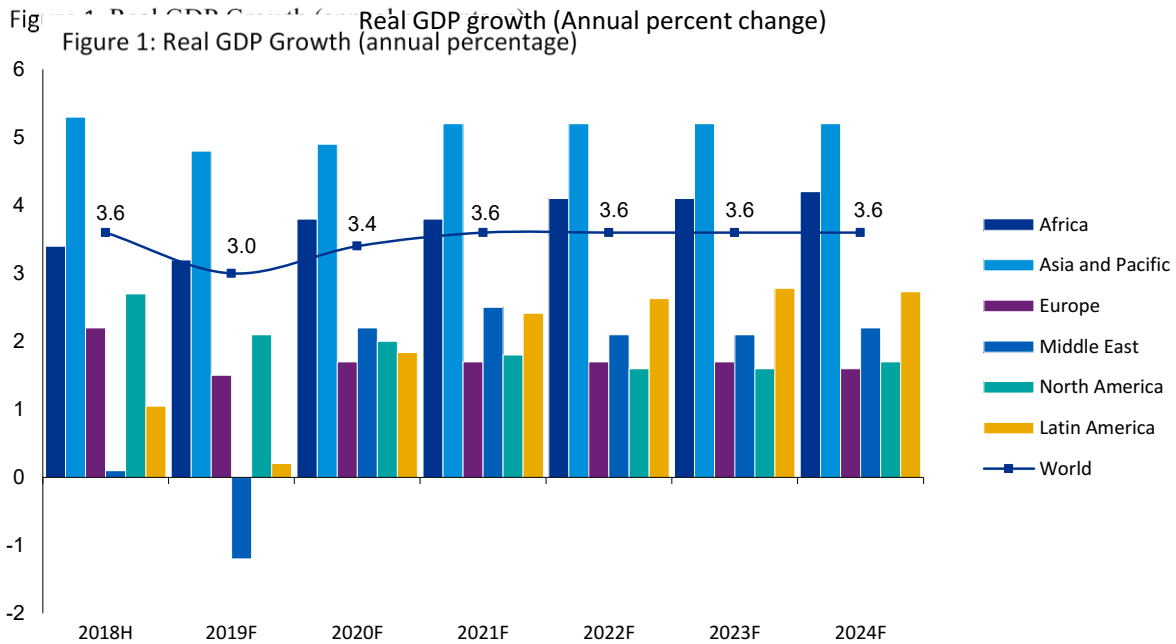
The valuation methods chosen to evaluate Pirelli are the DCF model and Multiples approach. It was decided to consider the DCF model as it is arguably the most used valuation method and is the one that provides the most quantitative and detailed analysis. The Multiples approach will be used as a way to have a comparison to the DCF valuation while checking its validity. At the same time, it will allow to compare Pirelli against its peers in terms of performance.

3. Macroeconomic Outlook

In terms of global economic growth, it is expected that it will grow by 3% in 2019 and improve to 3.4% in 2020. 2019 growth will be heavily impacted by the downgrades in the growth of China and other emerging Asian countries caused by effects of the trade tensions between the United States of America and China. (World Bank)

It is projected that global economy will pick up its growth in 2020 and it is mainly due to the expected stabilization or recovery of stressed economies, such as Iran and Venezuela and emerging economies, such as Argentina and Turkey. This stabilization of individual economies should account for 70% of the growth forecast for 2020 relative to 2019. It is essential to mention that economic growth for 2020 is very dependent on trade tensions between China and the United States of America and Brexit. (World Bank)

The following graphic contains economic growth forecasts, done by the *International Monetary Fund*, for the next five years, which will be considered in the forecasting of future Pirelli's revenues.



Source: World Bank

Sol

Also, by examining the above, we can see that there will be deceleration of the economic growth of developed regions, namely North America and Europe. Emerging regions are expected to be the ones supporting the next five years economic growth. Latin America, especially Brazil looking recover from its presidential election, is the region that is expected to improve compared to previous years. Asia and Pacific are still expected to keep growing at a steady pace, despite its leading player China having trouble to keep growing at its current pace of 6%.

4. Tyre Manufacturing Industry Outlook

The tyre market can be divided into two major segments, the O.E. and Replacement segments. The O.E. segment consists of the tyres fitted into vehicles that are brand new, leaving the factories of car manufacturers worldwide. The Replacement segment, as the name suggests, represents the tyres that are fitted in used vehicles when the O.E. tyres get worn down and need to be replaced.

On the one hand, in 2018, the total number of tyre pieces composing the O.E. segment was 457 million, compared to the 462 million pieces of 2017. For 2019 it is expected that the number of

pieces O.E. segment, according to Pirelli's own forecast, decreases even more to 437 million. This is due to the deceleration of the automotive production.

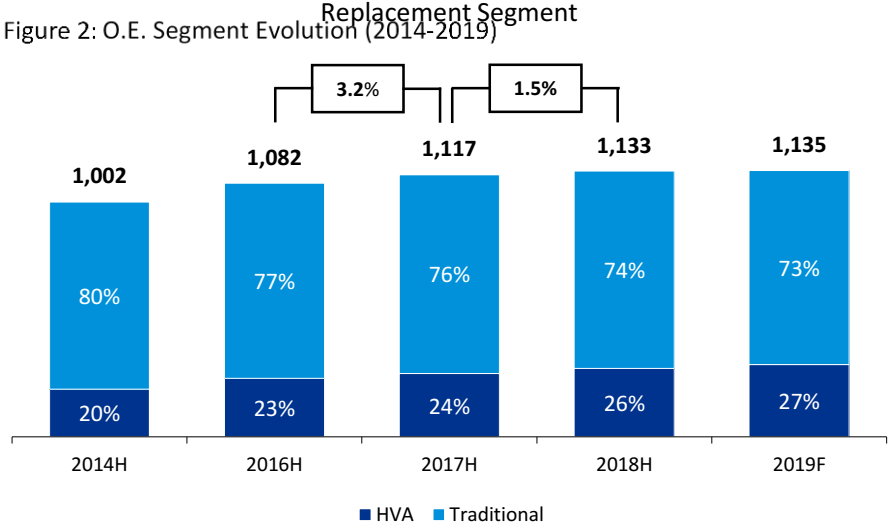
On the other hand, the total number of pieces produced for the Replacement segment was 1133 million, increasing 16 million pieces when compared to 2017. For 2019, contrary to the O.E. segment, it is projected that the number of pieces produced for the Replacement segment increases to 1135 million.

Additionally, the tyre market can be further divided into more segments. Most tyre manufacturers segment their tyre offering into Standard tyres, for rim sizes 16 inches or lower, and High Value (HV) tyres, for rim sizes 17 inches or higher.

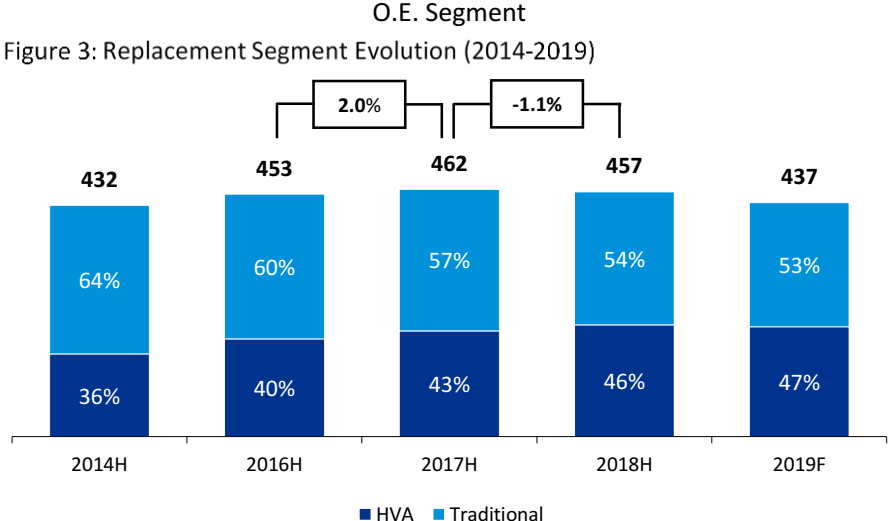
There is a clear trend in the tyre market, the demand for HV tyres has been growing at a very promising pace, as car manufacturers fit bigger rim sizes in their models. As a consequence, since the number HV pieces being produced for the O.E. segment was 45.7% of the total number of tyres produced for that segment, while in 2017 that number was 42.7%, meaning that between 2017 and 2018 there was a 3%. For the Replacement segment, the trend is the same. In 2018, the number of Replacement tyres that were HV was 25.7% of the total Replacement segment, whereas in 2017 it was 24.2%. The 2019 forecast for the HV segment is that it continues to grow, while the opposite happens for the Standard tyres.

Regarding Standard tyres, for the O.E. segment the trend is that with manufacturing fitting bigger rims on their vehicles, the need for this tyre type will decrease every year at a quite fast pace. For the Replacement sector, naturally, the trend is the same but at a slower pace, since there are still a considerable amount of vehicles that were bought with rim sizes below 16 inches that are still going to need to replace tyres from time to time. The following graphics display

how the tyre market has been evolving over time, divided between the segments and tyre types explained above.



Source: Pirelli's November Company Presentation



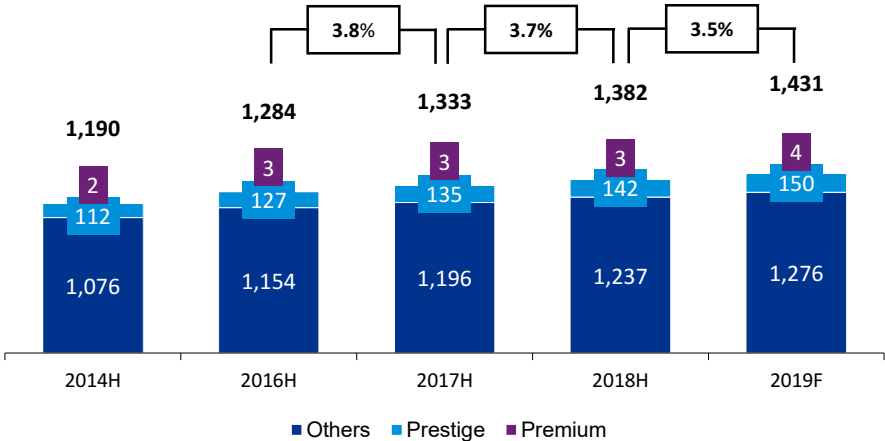
Source: Pirelli's November Company Presentation

There are six key drivers expected to influence demand for the next few years for the Tyre Manufacturing Industry. The first one is the penetration of premium & prestige cars, which is already one of today's market drivers, but its influence is undoubtedly going to be higher in the future. Next, the increase in the number of homologations is also going to have an impact on the demand for tyres. Thirdly, there is an increasing demand for specialty tyres with the more specific demand from the manufacturers and the necessities of more educated car users. The fourth driver is the rising penetration of SUVs, which is a vehicle category that requires the use of bigger size rims. Next, the car evolution is also forecasted to impact the demand of the market, as all automotive segments, starting at the entry-level models, are being fitted with

bigger rims, that require bigger tyres. Finally, new car technologies are going to be, on a more long term approach, are going to influence what car manufacturers' tyre demand will be.

4.1 Driver 1: Rising Penetration of Premium and Prestige Cars

Figure 4: Prestige & Premium Segments (2014-2019)



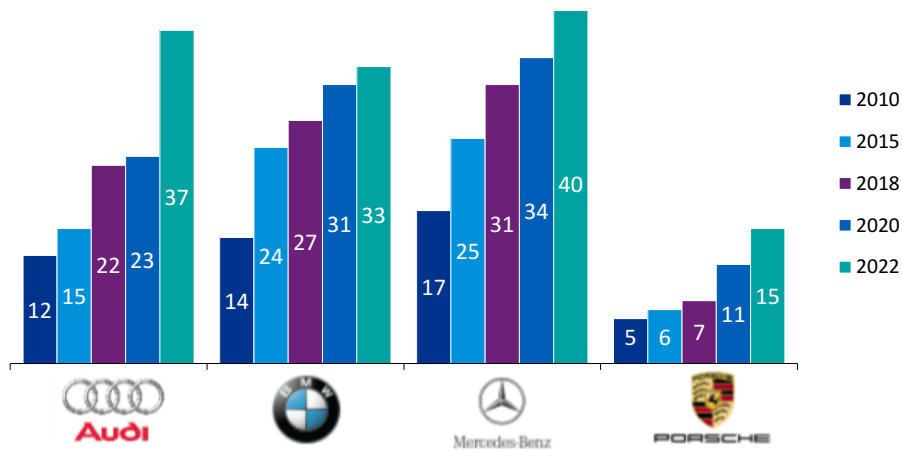
Source: Pirelli's November Company Presentation

The graph above demonstrates how the number of vehicles prestige and premium vehicles has been evolving since 2014. It is clear that there is a definite increase in the demand for this kind of vehicles. Cars in these segments are fitted from the factory with HV tyres, meaning that for the future, the demand for this tyre segment will be growing as the manufacturers are producing more premium and prestige vehicles.

4.2 Driver 2: Increase in the Number of Homologations

With the recent trend of individualization in all kinds of industries, the automotive industry is no exception and customers are looking to differentiate themselves through the type of car they drive. As a consequence of this recent trend, manufacturers are creating more car models than ever.

Figure 5: Number of Car Models Evolution



Source: Pirelli's November Company Presentation

The previous graphic puts in numbers what was said above. It is essential to mention that as manufacturers are adding each year more electric-powered vehicles to their model lines, increasing the number of homologations exponentially.

Additionally, caused by the individualization trend, manufacturers are offering more wheel options to fit their model lines, allowing customers to choose between vast varieties of wheel options varying in size. As a result, tyre producers need to produce a more diverse variety of tyres.

4.3 Driver 3: Growing Demand for Specialties

Both for the O.E. segment and the Replacement segment, there is a demand for more speciality tyres to fit different kinds of needs and the new technology being fitted to vehicles. For example, manufacturers are looking for noise-cancelling tyres to fit their silent electric models or *run-flat* that increases the safety of their vehicles. As for the Replacement sector, car owners are looking more into personalized colour tyres, racing-oriented tyres and even collection tyres to fit classic models.

4.4 Driver 4 & 5: Rising Penetration of SUVs & Car Development to Bigger Rims

Sport Utility Vehicles, or more commonly known as SUVs, are vehicle type that increased the most its market penetration in the last 20 years. SUVs, in most cases, are bigger than other

vehicles and as a result, need bigger wheels and tyres. In 2000 it was sold around 5 million SUVs worldwide with a penetration of 10%, while in 2020 it is expected that the number of SUVs sold is 33 million with a penetration of 38%.

Moreover, there is a clear tendency for car manufacturers to increase the wheel size of their cars, for either esthetical reasons and to accommodate the higher performances of modern cars. For example, the BMW M5 model sold between 1985 and 1987 was fitted with 15-inch rims while today's BMW M5 model is fitted with 20-inch rims.

4.5 Driver 6: New Car Technologies

The future of the automotive industry is projected to be heavily impacted by technology. Technology has enabled cars to be connected to a mobile data connection, allowing tyre manufacturers to allow car users to assess tyre conditions, such as load and wear. Next, with the increasing penetration of electric-powered cars, tyre makers are developing tyres that eliminate rolling noise and accommodate the immediate torque delivered by high powered electric motors. Another trend of the car industry enabled by technology is the ability to share cars, considering this tendency tyre producers are developing cloud base solutions for fleets. Finally, the technology that is set to influence the most the automotive industry is the autonomous driving, accounting for this tyre manufacturers are studying ways to provide ways for cars to have real-time tyre information in order to improve safety.

5. Company Overview

Pirelli & C SpA has its headquarters in Milan, Italy, in the same place it was created in 1872 by Giovanni Battista Pirelli. Pirelli is a global player focused on the consumer tire market, producing and selling tyres for cars, motorcycles and bicycles. For a long time, Pirelli's business could be divided into two main segments: Tyres for consumer cars and motorcycles and tyres for industrial vehicles, such as buses, heavy trucks and agricultural machinery. Nevertheless, since 2017 after a reorganization of the company it decided to drop the industrial segment. Pirelli was able to establish many partnerships with renowned carmakers such as Bentley, Aston Martin and Porsche, among others. The consumer tyre segment is the predominant segment in terms of revenue, where Pirelli is the leader in the High-Value tyre segment.

In 1901, Pirelli started producing car tyres and was able to grow at a fast pace due to rapid development of processes and products and also by establishing a significant presence in car racing associate with a substantial geographic expansion.

By 1922, Pirelli was able to be listed in the Milan Stock Exchange, and still in the 1920s was able to be a listed company in the New York Stock Exchange. 1929 was the year of Pirelli's outside of Europe expansion, with the inauguration of its first Brazilian plant.'

After the First World War until the 1960s, Pirelli continued growing its operation by building new plants in emerging economies of the time and by also being pioneers in tyre technology.

During 1963, Pirelli made its first major acquisition, by acquiring a Germany based tyre maker, called *Veith Gummiwerke AG*.

During the eighties, Pirelli consolidated its international expansion by opening two additional Brazilian Plants, establishing Brazil as a critical country for Pirelli's operations, where a large number of Pirelli's tyres were manufactured. Also, in 1986, in order to reinforce its presence in the motorcycle tyre segment, Pirelli acquired another Germany tyre maker, called *Metzeler Kaotsuck AG*. With the goal of entering the North American market, in 1988, Pirelli acquired Armstrong Tyre Company, in what was the first of many movements to enter that market.

Following a market recession and a failed acquisition of *Continental AG*, where many funds were wasted, in the early nineties, Pirelli had to go through a severe corporate and financial reorganization.

The 2000s were times of consolidation and reorganization of Pirelli's business. In 2001, Pirelli acquired a share in *Telecom Italia SpA* and became the reference shareholder until 2007.

In 2005 Pirelli made a massive leap into the Asian market by opening its first Chinese plant.

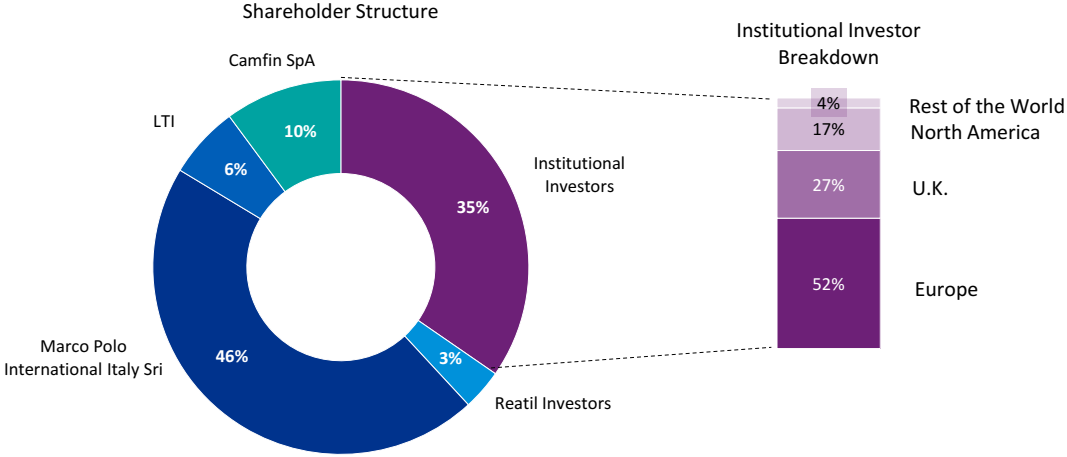
Moving on the 2010s, in 2010 Pirelli finalized its conversion into a "pure tyre company" by dismissing *Pirelli BroadBans Solutions* and a spin-off of *Pirelli & C. Real Estate*. Still, in 2010, Pirelli returns to Formula 1, and in 2011 it becomes the exclusive supplier of the series.

In the spring of 2017, following a reorganization process, there was a transfer of Pirelli's Industrial Tyre business to shareholder Marco Polo. On October 4, 2017, Pirelli returned to the

stock market, enriched with the creation of new departments and businesses, such as Consumer Marketing, Digital, Data Science, Cyber and Velo.

5.1 Shareholder Structure

Figure 6: Shareholder Structure



Source: Pirelli's November Company Presentation

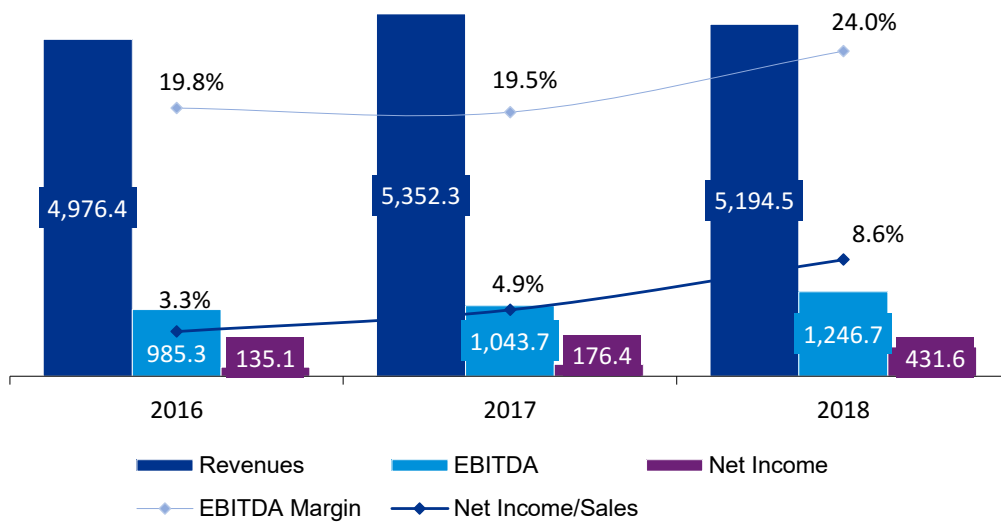
As displayed in the graphic above, Marco Polo International Italy Sri is the largest shareholder of the company detaining 46% of *Pirelli & C SpA*. The free-float part of the shareholder structure is 38% of the overall equity. Additionally, the majority of the institutional investors are distributed through Europe, the U.K. and North America.

5.2 Business Summary

In order to better understand the revenues forecast to be presented in section 6, an overview of Pirelli's strategic progression in terms of product categories, geographical focus and distribution channels is presented.

Financial KPIs

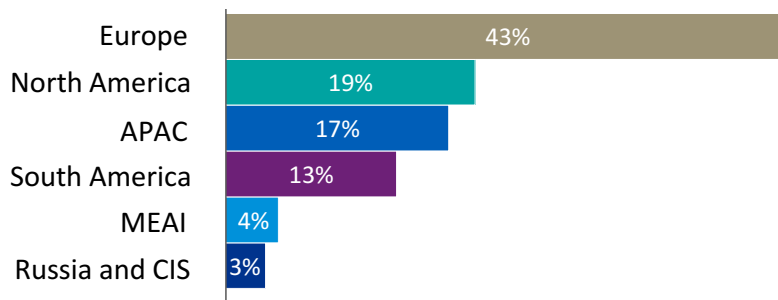
Figure 7: Financial KPIs



Source: Pirelli's Annual Reports (2016-2018)

In 2018, sales were 5,194 million euros, a slight decrease when compared to 2017. Still, both EBITDA and Net Income increase substantially compared to 2017, being around 1,247 and 432 million euros, respectively. In summary, Pirelli was able to meet its goals for the year 2018 and improve in 2017.

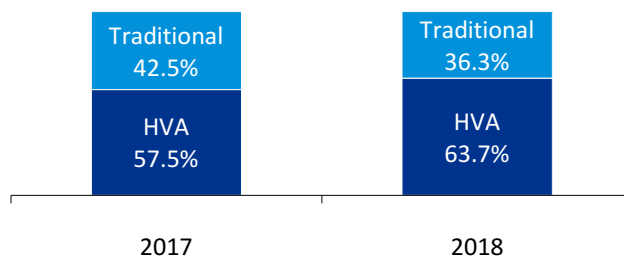
Figure 8: 2018 Revenue by Region



Source: Pirelli's Annual Report (2018)

In terms of Revenues in 2018, it is important to mention that Europe, North America, Asia Pacific (APAC) and Russia and CIS gained weight in the total revenue generation at the expense of a severe reduction of the South America region that went from being responsible for generating 17.1% of sales in 2017 to just 13.3% in 2018. Also, Middle East/Africa/India region decreased its contribution slightly, from 4.7% in 2017 to 4% in 2018. Both these regions' demand for tyres is mostly composed of tyres for smaller rim sizes, so it is natural that sales decrease in these regions since Pirelli is divesting in the Standard Segment.

Figure 9: 2018 Revenue by Segment



Source: *Pirelli's Annual Report (2018)*

In 2018, Pirelli was able to strengthen its High-Value segment, increasing its weight in the total revenues to 63.7%, increasing from 57.5% in 2017. HV recorded a growth of 11% due to a gain in market share in the New Car Premium segment. Furthermore, Pirelli sales volume for car tyres larger than 17 inches grew 14.3% compared to the 10.0% of the market in that segment. In terms of EBITDA generation, the HV segment was responsible for 83% of it in 2018.

In the Standard segment, there was a reduction of exposure on with a -14.0% contraction in volumes caused by the progressive exit from products with a lower rim diameter and lower profitability, in context of the general slowdown of the Standard market. Regarding EBITDA generation, the Standard segment was responsible for 17% of that.

It is still important to mention that most of the analysis is focused on car-oriented tyres, since around 93% of the revenues come from this segment, while the remaining 7% comes from the motorcycle segment.

Moreover, it is still possible to divide revenues between the O.E. segment and the Replacement segment. In 2018, the O.E. segment was responsible for 25%, and the remaining 75% was generated by the Replacement segment.

Finally, regarding production capacity, Pirelli had in 2018 19 plants distributed through 12 different countries. Plus, in 2018, 79% of the production was done in low-cost countries, while the rest, 21%, was produced in developed countries.

6. Valuation

Supported on sections 4 and 5 where it was provided a macroeconomic outlook as well as an overview of Pirelli, this section will have into account a set of assumptions for the forecast periods allied to historical financial information. Additionally, all methodologies used to reach the value of Pirelli and consequently, its share price will be fully clarified in this section. To end this section, a sensitivity analysis will be performed so that the uncertain nature of certain assumptions can be considered.

As it was described in section 5, in 2017 re-entered the stock markets following a period of restructuring of the company. That will not have any detrimental impact on this valuation, as the company was already operating in a similar way to what it is today in the historical period chosen, which is between 2016 and 2018. According to the company's strategy of continuous investment and growth, cash flow projections will be made until 2024, entering in a stable growth from 2025 onwards.

Concluding, a forecast period of 6 years will be covered, with 2019 being based on Pirelli's own estimations for that year, and the following based forecasts for the company based on a set of assumptions until the company reaches its stable state.

6.1. Forecast Assumptions – Income Statement & Balance Sheet

6.1.1. Revenue Forecast

Revenue is the first item of any income statement and is unarguably the most crucial element of any forecast. Two methods are typically used when estimating future sales: (1) Applying an aggregate growth rate or (2) Sum of parts to reach a growth rate (segment level approach).

The growth rate assumed for the future sales of Pirelli will be determined based on the second method presented. Tire sales have no specific trends, meaning that sales are distributed evenly throughout the year. The following projections will have into account information given in sections 3 through 5.

6.1.1.1. Product & Mix

As explained in section 4, tires are divided into segments according to their size, belonging either to the HV segment or the Standard Segment. Moreover, they can be segmented between Replacement and O.E. tires. Regarding the segmentation between Replacement and O.E., the

percentage of number of tyres sold by Pirelli to each segment (75% and 25% respectively) has been constant over time, and so I will assume that that trend continues in the future, as most of the possible car manufacture tyre supply contracts that Pirelli could have made were made already. Therefore, this will not impact the valuation. As for the segmentation between HV and Standard tyres, we know that the number of HV tyres being sold has been increasing while the number of Standard tyres being sold has been decreasing. Also, HV tyres were responsible for around 60% of the Revenues of Pirelli in 2018, which combined to the increase in the global demand for HV tyres would cause Pirelli's sales to increase. However, the decrease in the Standard tyre Revenue has been offsetting the gains from the higher HV sales volume. As a consequence, the overall number of tyres sold by Pirelli has decreased from 2017 to 2018 and considering Pirelli's estimates for 2019, there will be a decrease for that year too. To estimate the remaining years of the projection period, it was used the expected growth in the overall *car parc* as, according to Pirelli in its 2019 Outlook presentation, there is a correlation between that number and the demand for tyres. Again, as stated in the 2019 Outlook presentation, from 2016 to 2019, the CAGR of the total *car parc* is 4% while the projected CAGR for the 2019 to 2022 period decreases to 3%. Additionally, from 2016 to 2019, the CAGR of the prestige and premium segments *car parc* is 6% while the projected CAGR of those segments for the 2019 to 2022 period decreases to 5%.

It is already confirmed by Pirelli, in its 2019 Outlook, that HV volumes increase 7.5% and Standard volumes decrease 10.5%. The remaining years were projected considering the decrease in the number of cars, and consequently, the demand for tyres, assuming that the increase in HV tyre units sold will decrease at constant rate until it reaches 6.5% in 2022, 1% down from 2019 Pirelli's own projections, to accommodate the 1% decrease in the prestige & premium *car parc* CAGR. Regarding Standard tyre units, the same methodology applied to the HV was implemented, since the overall *car parc* CAGR also decreases by 1% until 2022. For the years following 2022, as there is no forecasted information, the growth rates of 2022 were kept.

Figure 10: Standard & HV units Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Standard	32.7	37.0	31.8	28.5	25.4	22.6	20.0	17.7	15.6
<i>growth (%)</i>		13.1%	-14.0%	-10.5%	-10.8%	-11.2%	-11.5%	-11.5%	-11.5%
HV	20.9	24.2	27.6	29.6	31.8	33.9	36.2	38.5	41.0
<i>growth (%)</i>		15.4%	14.1%	7.5%	7.2%	6.8%	6.5%	6.5%	6.5%
Total	53.63	61.15	59.38	58.12	57.16	56.49	56.13	56.18	56.65
<i>growth (%)</i>		14.0%	-2.9%	-2.1%	-1.3%	-1.0%	-0.6%	0.1%	0.8%

Source: Pirelli's Annual Report for Historical Data

6.1.1.2. Price & Mix

Price & Mix has been the biggest driver of the growth in revenue for the last few years, and in the future, it is expected to continue to be moving forward. Pirelli was able to vastly improve its Price & Mix with increases of over in each year, and this was crucial for Pirelli to manage their results and offset eventual losses due to foreign exchange. Pirelli was able to improve its Price & Mix mainly due to the growing share of the High-Value segment and by the increase in prices in emerging markets to counter exchange rates' volatility.

What was said on section 6.1.1.1. regarding the evolution of units sold in each segment being correlated with the decrease in *car parc*, also has an implication to this Revenue driver. In this case, the effect of the projected decreasing CAGR should impact less this driver, since it is also impacted by inflation. As a consequence, it was assumed, similarly to what was assumed for the Product & Mix driver, that until 2022 Price & Mix gains should decrease from the confirmed for 2019 by Pirelli 4,5% to 4%. From 2022 onwards, as there is no information available for that period, it will be assumed that the Price & Mix driver remains constant at 4%.

Concluding, the second main revenue driver for the future is the fact that Pirelli has been successful in improving its average price. This is possible has the average price of an HV tyre is superior to the average Standard tyre price. Adding to that, Pirelli has been efficient in adapting its sale prices in unstable regions such as Latin America.

Figure 11: Average Tyre Sale Price (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Avg Sell Price	92.79	87.53	87.48	91.42	95.38	99.35	103.32	107.46	111.76
<i>growth (%)</i>		-5.7%	-0.1%	4.5%	4.3%	4.2%	4.0%	4.0%	4.0%

Source: Pirelli's Annual Report for Historical Data

Figure 12: Revenue Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Revenues	4976	5352	5195	5313	5451	5612	5799	6037	6331

Source: *Pirelli's Annual Report for Historical Data*

6.1.2. Cost of Goods Sold (COGS)

There were two factors that helped determine what would be COGS for future periods. The first one was the fact that the percentage of Cost of Goods Sold in the total Revenue has been remarkably stable for every year of the historical period of 2016-2018. In that period, the ratio COGS/Revenue has ranged between 51.2% and 51.4%. The second one is related to Pirelli's already high cost-efficiency compared to its peers, being the benchmark in this department with 75% of its production done in low-cost countries taking advantage of the lower raw material costs of those locations, meaning that there is not much room to improve in this department.

Considering the two factors explained above, COGS were estimated as a percentage of Revenue of the year and that percentage will be an average of the historical period's COGS/Revenue ratio, which is 51.3%.

Figure 13: Cost of Goods Sold Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
COGS	-2546.90	-2751.10	-2665.30	-2725.28	-2796.35	-2878.97	-2974.85	-3096.75	-3247.54
% of revenues	51.2%	51.4%	51.3%	51.3%	51.3%	51.3%	51.3%	51.3%	51.3%

Source: *Pirelli's Annual Report for Historical Data*

6.1.3. Operational Expenses (OPEX)

Operational Expenses are divided in two main categories: Personnel and Other Operational Expenses.

6.1.3.1. Personnel Expenses

Pirelli has historically been an extremely volatile company when it comes to Personnel expenses. There are two main components that constitute any Personnel expense, which are number of employees and average cost per employee.

The increases in the number of employees was estimated by doing an average of the increases in the past years considered. Throughout the historical period chosen to support this valuation Pirelli's employee number increased every year, and it would be expected that personnel costs

would increase as a result of new hires combined with inflation. However, despite seeing the expected effect in 2017, in 2018 the overall Staff cost decreased. Historically the same situation has happened before. As a consequence, it becomes complicated to forecast future Personnel Expenses. Nonetheless, it was decided that the best possible forecast for this part of the valuation would be to grow average cost per employee of each year at the average of the previous two years growth rates, applying a moving-average technique.

Figure 14: Personnel Expenses Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Nr of Employees	29787	30189	31489	32340	33191	34042	34893	35744	36595
+/-		402	1300	851	851	851	851	851	851
Cost per Employee	0.033	0.034	0.034	0.034	0.034	0.035	0.035	0.035	0.035
growth (%)		3.5%	-1.1%	1.2%	0.1%	0.6%	0.4%	0.5%	0.4%
Personnel Expenses	986.30	1034.65	1067.58	1109.74	1139.72	1176.44	1210.13	1245.82	1280.92

Source: Pirelli's Annual Report for Historical Data

6.1.3.1. Other Operational Expenses

Other OPEX includes expenses such as R&D and other unspecified costs. Again, these costs were calculated in percentage of revenues to understand if there were any patterns over the years of the historical period. Other OPEX ranged between 7.1% and 9.8% without any clear upward or downward trends. Thus, in the end, it was considered that the future Other Operational Expenses would be determined considering the three-year average Other OPEX/Revenue ratio of the historical period, which is 8.4%.

Figure 15: Other OPEX Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Other OPEX	414.30	522.05	366.42	445.09	459.07	473.80	489.57	509.62	534.42
% of revenues	8.3%	9.8%	7.1%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%

Source: Pirelli's Annual Report for Historical Data

6.1.4. Capital Expenditures (CAPEX)

Naturally, it makes sense to distinguish between capital expenditures done on Property Plant & Equipment (PPE) and capital Expenditures of Intangible Assets.

6.1.4.1. Property Plant & Equipment CAPEX

Through its website, as previously stated, Pirelli shares an outlook for 2019, which was used as a source of assumptions for the future. Therefore, PPE CAPEX for 2019 would be 367 million

€, being around 11.5% of the total Property Plant & Equipment of that year. Having in consideration Pirelli's own estimations I decided to consider the same percentage of PPE CAPEX over total PPE for the following periods PPE CAPEX calculations, as the rate computed in 2019 is already reflecting Pirelli's most recent investment policies to be applied in the future. It is essential to mention that PPE CAPEX is growing at a faster rate than the depreciation (which will be discussed further ahead) to accommodate the growing state of the company.

Figure 16: Property, Plant & Equipment CAPEX Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
PPE CAPEX	363.47	470.38	451.80	367.00	376.24	384.35	391.20	396.65	400.60
<i>% PPE</i>	10.2%	15.8%	14.6%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%

Source: Pirelli's Annual Report for Historical Data

6.1.4.2. Intangible Assets CAPEX

Contrary to PPE CAPEX, in which Pirelli has been investing at a good pace each year, Pirelli has been less prominent when it comes to Intangible Assets CAPEX. During the historical period, IA CAPEX as always been less than 0.5% of total Intangible Assets value, a rate inferior to the Intangible Assets depreciation rate. Subsequently, it was assumed that the same trend continues for the future periods of the forecast, and so, upcoming IA CAPEX will be computed based on the average of the historical period's IA CAPEX/Intangible Assets rate, which is approximately 0.23%.

Figure 17: Intangible Assets CAPEX Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
IA CAPEX	8.72	18.97	11.64	13.11	12.81	12.52	12.81	12.71	12.68
<i>% of IA</i>	0.1%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%

Source: Pirelli's Annual Report for Historical Data

This valuation considers that for 2019 total CAPEX is 380 million €, which is already confirmed by Pirelli as the actual CAPEX value for 2019.

Figure 18: Total CAPEX Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Total CAPEX	372.18	489.35	463.44	380.11	389.04	396.87	404.01	409.36	413.28

Source: Pirelli's Annual Report for Historical Data

6.1.5. Depreciation & Amortization

Figure 19: Depreciation & Amortization Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Depreciation & Amortization	392.38	370.87	394.30	408.58	431.44	454.37	477.17	499.63	521.53
Depreciation	273.82	250.67	269.08	278.33	296.15	314.04	331.83	349.35	366.40
Amortization	118.55	120.20	125.22	130.25	135.30	140.33	145.34	150.28	155.14

Source: Pirelli's Annual Report for Historical Data

In what is concerned with depreciation and amortization, it was assumed that Pirelli will continue depreciating and amortizing its assets at a similar pace. As expected, Pirelli differentiates between the depreciation of its fixed assets and amortization of its intangible assets, and so, it was followed the same approach in this valuation.

6.1.5.1. Property Plant & Equipment Depreciation

Referring to the historical period of 2016-2018, Pirelli's depreciation rate of PPE has been constantly rising. This increase can be credited to the fact that Pirelli's Capital Expenditures are made mostly on assets with higher depreciation rates such as vehicles, furniture and equipment. Meaning that the average depreciation of total intangible assets will also rise as a consequence. Bearing in mind this increasing tendency, to estimate future PPE depreciation it was considered the growth between 2017's PPE depreciation rate and 2018's PPE depreciation rate, and after that it was applied that growth rate to the projected period. Once calculations were made, the projected percentage at what PPE Depreciation will grow in the future is 3.4% with depreciation rates expected to range between 9.0% in 2019 to 10.7% in 2024.

Figure 20: Property, Plant & Equipment Depreciation Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Gross Tangible Assets	3935.82	3587.71	3921.00	4288.00	4664.24	5048.59	5439.78	5836.44	6237.04
Accumulated Depreciation	379.18	607.42	828.10	1106.43	1402.58	1716.62	2048.45	2397.80	2764.19
Yearly Depreciaton	273.82	250.67	269.08	278.33	296.15	314.04	331.83	349.35	366.40
Average depreciation rate (%)	7.7%	8.4%	8.7%	9.0%	9.3%	9.6%	10.0%	10.3%	10.7%
growth (%)		9.2%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%	3.4%

Source: Pirelli's Annual Report for Historical Data

6.1.5.2. Intangible Assets Amortization

Again, just like PPE depreciation, IA Amortization has shown a clear upward and has proved to be steadily growing throughout the historical years. This is a natural tendency since Capital Expenditures are mainly done on Intangible Assets with higher amortization rates, increasing

their value in the total IA composition. The same procedure applied to determine PPE depreciation was used to compute future amortization rates. As a result, Amortization will be growing at the same rate it grew in 2018, 6.2%, for the totality of the forecast period with amortization rates projected to range between 2.3% in 2019 to 3.1% in 2024.

Figure 21: Intangible Assets Depreciation Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Gross intangible Assets	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Accumulated amortization	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Yearly amortization	118.55	120.20	125.22	130.25	135.30	140.33	145.34	150.28	155.14
Average depreciation rate (%)	1.8%	2.0%	2.2%	2.3%	2.4%	2.6%	2.8%	2.9%	3.1%
growth (%)		11.8%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%

Source: Pirelli's Annual Report for Historical Data

6.1.6. Property Plant & Equipment

After determining the Capital Expenditures as well done on PPE as well as the depreciation suffered, reaching an estimation of this asset category for the forecast period was possible. As stated in section 6.1.4.1. PPE CAPEX is going to be a stable 12.1% of total Fixed Asset value for the period 2019-2024, and that combined with the increasing rate of depreciation still allows for Property Plant & Equipment to grow in the forecast period, although at a decreasing rate. This is consistent with the company reaching its mature state as time advances.

Figure 22: Property, Plant & Equipment Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
PPE	3556.64	2980.29	3092.90	3181.57	3261.66	3331.97	3391.34	3438.64	3472.84

Source: Pirelli's Annual Report for Historical Data

6.1.7. Intangible Assets

As seen before in previous sections, IA Amortization will be growing at a stable rate combined with a lower and fixed IA Capital Expenditure value throughout the estimated period will result in a decreasing value of Intangible Assets. This is in line with the evolution of past years Intangible Assets and as there are no announced plans to change the way this kind of Assets have been evolving, it seems fitting that the same trend is kept in the foreseeable future.

Figure 23: Intangible Assets Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Intangible Assets	6496.89	5893.70	5783.34	5666.20	5543.71	5415.90	5283.37	5145.79	5003.34

Source: Pirelli's Annual Report for Historical Data

6.1.8. Working Capital

Changes in Net Working Capital takes part in the FCFE calculations and therefore, it is necessary also to estimate how the constituents of the NWC are expected to evolve in the forecast period. Working Capital includes Account Receivables, Inventories, Account Payables, Income Tax Receivables/Payables and Other Current Assets/Liabilities.

6.1.8.1. Account Receivables

Account Receivables contribute positively to Net Working Capital and represent an Asset to Pirelli in the form of payments still to be received for products sold. To estimate this component of the Net Working Capital, it was determined the Days Sale Outstanding (DSO) at the end of each historical year (2016-2018). By computing historical DSO, it was possible to see that Pirelli has been able to reduce the number of payments to receive at the end of each year. Having that in consideration I calculated DSO for the forecast period at the decreasing rate registered from 2017 to 2018. Moreover, having forecasted DSO with simple mathematics, it was possible to obtain Accounts Payable for the entire forecast period. In the end, forecast DSOs range from 43.8 days in 2019 to 42.0 days in 2024.

Figure 24: Account Receivables Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Accounts Receivables	679.32	652.49	627.97	636.91	651.44	666.74	683.18	705.23	733.38
DSO	50	44	44	44	43	43	43	42	42
growth (%)		-10.7%	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%

Source: Pirelli's Annual Report for Historical Data

6.1.8.2. Inventories

Regarding Inventories, a similar methodology to the one used to forecast Account Receivables was used to estimate future Inventory values. Days of Inventory on Hand (DIH) were calculated for the historical years and studied to see if there were any particular patterns. Indeed, there were similarities in 2016 and 2018, while 2017 was an outlier year where DIH were extremely low. Thus, it was decided that the most accurate way of estimating Inventories for future periods was to consider 2018 DIH as the reference value for the remainder of the forecast period, as the most recent should be what is closest to future plans of the company regarding this matter. It is crucial to mention that 2016 and 2018 DIH are incredibly similar. In the end, it is assumed that DIH are 154.5 days for years 2019-2024, resulting in an increasing inventory value since DIH is calculated based on COGS which increase during the mentioned period.

Figure 25: Inventories Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Inventories	1055.64	940.67	1128.00	1153.39	1189.62	1227.80	1268.65	1320.61	1384.88
DIH	151	125	154	154	154	154	154	154	154

Source: Pirelli's Annual Report for Historical Data

6.1.8.3. Account Payables

Again, to estimate how Account Payables will be moving forward, Days Payable Outstanding were determined for the years 2016-2018. These showed a clear growing pattern meaning that Pirelli is taking more time to pay back its current obligations. Having this growth pattern into account, DPOs for the forecast periods were computed based on an increasing rate of 0.76%, the same rate at which DPO increased from 2017 to 2018, resulting in DPOs ranging from 144 days in 2017 to 149.5 days in 2024. By combining increasing DPOs with increasing current obligations, the Account Payable value will be increasing during the course of the forecast period.

Figure 26: Account Payables Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Accounts Payables	-1498.49	-1673.64	-1604.68	-1688.12	-1755.44	-1827.01	-1902.09	-1991.05	-2095.08
DPO	139	142	143	144	145	146	147	148	149
growth (%)		2.3%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%

Source: Pirelli's Annual Report for Historical Data

6.1.8.4. Tax Receivables/Payables

In Pirelli's specific case, Tax Receivables/Payables are one of the most delicate subjects, as a consequence of the recent restructuring and re-entry in the stock exchange, recent years showcased a differential between tax receivables and tax payables that is not consistent with what it would be during the regular operation of Pirelli. In 2016, before Pirelli re-entered the exchange markets, Tax Receivables/Payments account was positive, mostly due to having higher tax receivables from income tax repayments from the government, as a result of past bad financial years, and also low tax payables from VAT received from customers. In 2017 and 2018 as Pirelli's operations accelerated again to better financial results, Tax Receivables/Payments account returned to normal negative values, which means that there is no longer tax money to be received at the end of each year, but instead tax money to be delivered to the government bodies.

Bearing in mind what was just explained, it will be considered the percentage of Tax Payables/Payments over EBITDA of 2018 to determine following periods Tax

Payables/Payments. Ultimately, leading to an increasingly negative account as time advances in the projected period.

The explanation given in this section leads to a constant ratio of Tax Payables/Payments/EBITDA of -2.2% and an account fluctuating between -24 million € in 2019 and -28 million € in 2024.

Figure 27: Tax Receivables/Payables Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Tax receivables/payables	12.23	-12.96	-24.11	-22.73	-23.30	-23.92	-24.84	-26.17	-28.00
<i>% of EBITDA</i>	1.2%	-1.2%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%	-2.2%

Source: *Pirelli's Annual Report for Historical Data*

6.1.8.5. Other Current Assets/Liabilities

Other Current Assets/Liabilities mostly consist of current financial instruments, such as derivatives, in the form of asset and liability, or securities available for trading. As investing on financial assets is not a core activity of Pirelli, there is not much detail regarding this type of current assets/liabilities, but still, it is worth it to consider in this valuation as it is a significant asset in terms of value for Pirelli.

As time progressed in the historical period, the Other Current Assets/Liabilities account went from very negative, meaning that there these instruments globally went from representing mostly liabilities for Pirelli to being assets of the company. Hence, it was determined in the forecast period that the ratio Other Current Assets/Liabilities/Revenues would be the same as in 2018. This was considered to be an accurate assumption as it is expected that in the foreseeable future that financial instruments represent assets for companies and not liabilities.

As a result, with an increase in Revenues and a stable and positive Other Current Assets/Liabilities/Revenues, this account is projected to range between 42 million € in 2019 and 50 million € in 2024.

Figure 28: Other Current Assets/Liabilities Evolution (2016H-2024P)

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
Other Current Assets/Liabilities	-579.18	-201.23	-58.48	41.51	42.59	43.85	45.31	47.17	49.46
<i>% of revenue</i>	-11.6%	-3.8%	-1.1%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%

Source: *Pirelli's Annual Report for Historical Data*

6.2. Discounted Cash Flow

After establishing the business plan for the next years, it was time to perform Pirelli's equity valuation. The first method to be applied was the Discounted Cash Flow model, where the FCFE formula, showcased in the Literature Review section, was applied. Additionally, and explained in section 2.2.3., the WACC determined as the discount rate was computed based on the CAPM model. This section's inputs will be based on what was previously explained in section 2 – Literature Review.

6.2.1. Weighted Average Cost of Capital (WACC)

The weighted average cost of debt is one of the most significant elements of every DCF valuation, as it is the rate at what future Cash Flows will be discounted. In the following sections, the three composing elements of the WACC formula estimations will be explained, based on what was previously presented in the *Literature Review* section.

6.2.1.1. Cost of Equity

According to what was presented in section 2, CAPM requires three inputs to be computed: Market Risk Premium (MRP), Risk-free Rate and Beta. Additionally, it was considered a third element, Country Risk Premium (MRP), so that the country risk of where Pirelli operates was taken into account.

To estimate the risk-free rate to be applied, it was decided to use a 10yr German Government Bond with a yield of -0.298% on 5th of December of 2019. A German Government Bond utilized since it is denominated in euros, which is the currency in which Pirelli presents its financial results and the currency of this valuation, and also because it is commonly used as the risk-free rate benchmark to use in Valuations.

Concerning the Market Risk Premium input, the Damodaran's dataset was used to extract the necessary risk premiums of the regions in which Pirelli sells its products. After that, it was performed a weighted average considering the weight of the different regions in the total revenue of Pirelli, as demonstrated in the table below. After computations, the MRP to be applied was 9.12%.

Regarding Beta calculations, Beta was calculated by performing a regression between last two years of Pirelli's weekly stock returns and last two years of the market weekly index returns.

Two years for the time frame of past returns was chosen as Pirelli returned to the stock market in October 2017, which only allowed to have two years of relevant stock market activity. Additionally, weekly returns were extracted since it is the time frame best appropriate to regress two years of returns of two equity instruments.

After that, it was run a regression between the two years weekly Returns of both Pirelli and the FTSE MIB index, returning a beta of approximately 1,07.

Finally, once all three inputs were calculated, the CAPM formula was put to use, reaching the following cost of equity: $r_e = -0,298\% + 1,07 * 9,12\% + 3,06 = 12,49\%$.

Figure 28: Cost of Equity Components

	Cost of Equity
Risk free	-0.298%
Beta Levered	1.07
Market Risk Premium	9.12%
Country Risk Premium	3.06%
Ke	12.49%

Source: Risk free – Market Watch; Beta Levered – Yahoo Finance for Stock Returns; Market Risk Premium & Country Risk Premium – Damodaran Website

6.2.1.2. Cost of Debt

Pirelli’s cost of debt was computed based on Pirelli’s risk spread. According to *NYU Stern*, the appropriate risk spread of a company is estimated considering its Interest Coverage Ratio, which is calculated by dividing the EBIT of a Company over its Interest Payment. For Pirelli, the estimated ICR for 2019 is around 2,98, which yields a Company Specific risk spread, according to NYU Stern risk spread for Large Manufacturing Firms table, of 2%. After extracting Pirelli’s risk spread, it was added the risk-free rate of -0,298, resulting in a cost of debt of roughly 1,7%.

This method for calculating Pirelli’s cost of debt was chosen as most of Pirelli’s debt financing is done in through bank loans, and not publicly traded debt.

6.2.1.3. Statutory Tax Rate

The Statutory Tax Rate allows having into consideration the effect of tax shields in the discount rate to be applied. In order to compute the Statutory Tax Rate, it was considered what the

theoretical tax burden of the countries where Pirelli’s principal companies operate. Next, the share of taxes paid by geographical area, presented in the 2018 annual report, enabled to calculate the theoretical tax rate that Pirelli would pay. This is the correct tax rate to be applied in the WACC formula as many times the effective tax rate paid by companies is not an accurate representation of what the tax rate will be for the future.

Figure 29: Theoretical Tax Rate

Europe	22.98%	56%
NAFTA	27.50%	12%
APAC	25.00%	21%
Latam	32.00%	6%
Russia & MEAI	20.00%	5%
Combined Tax Rate	24.34%	

Source: Pirelli’s Annual Report (2018)

In the end, the tax rate to apply in the WACC formula is Pirelli’s theoretical 24.34% tax rate, and it will be assumed that it will remain stable for the future.

Now that all the necessary elements of the Weighted Average Cost of Capital are estimated, it is possible to determine what will be the discount rate to be used in the DCF valuation of Pirelli. As revealed in section 2, the WACC formula uses the capital structure of companies to determine the weight of each way of financing the company utilizes. Consequently, the *Debt/EV* and *Equity/EV* were computed. As for the Debt value of Pirelli, it was removed from the financial statements of the company, since the amortized debt value contained in the report should be a close to the actual value since it is mostly composed of bank loans. Moreover, the equity considered is at market value, computed by considering the number of shares outstanding and the share price on the 29th November of 2019. Ultimately, it was reached a *Debt/EV* of 47.89% and an *Equity/EV* of 52.11%, which is consistent with what is presented by most financial databases.

Once the Pirelli’s capital structure was determined, and with all the necessary inputs estimated, the last step of the WACC calculation process was to plug in the inputs in the WACC formula. In the end, the WACC after-tax estimated to be used in the valuation is 7.33%.

6.2.2. Free Cash Flow to the Firm (FCFF)

Figure 31: Free Cash Flow to the Firm

	2016H	2017H	2018H	2019F	2020P	2021P	2022P	2023P	2024P
FCFF	501.79	355.38	97.80	448.42	532.67	553.20	580.78	623.93	684.99
<i>growth (%)</i>		-29.2%	-72.5%	358.5%	18.8%	3.9%	5.0%	7.4%	9.8%

Source: *Pirelli's Annual Reports for Historical Data*

Figure 32: Discounted Free Cash Flow to the Firm

	2019F	2020P	2021P	2022P	2023P	2024P
Discounted Cash Flow	448.42	496.31	480.26	469.79	470.25	7787.76
<i>growth (%)</i>		10.7%	-3.2%	-2.2%	0.1%	1556.1%

Source: *Pirelli's Annual Reports for Historical Data*

The input variables to reach the Free Cash Flow, were explained in the both this section and the previous. Additionally, to compute the FCFF it was multiplied (1-tax rate) by the EBIT and then added Depreciations & Amortizations. Then, CAPEX and changes in Net Working Capital were deducted. Finally, $1/(1+WACC)$ to the power of each corresponding year was used as a discount rate for the Cash Flows.

6.2.3. Terminal Value (TV)

To determine the terminal value, it was used the last estimated year, 2024, as a basis to estimate the perpetual Cash Flow. Firstly, Revenues were increased at the perpetuity growth rate, and as most of the other elements of the cash flow are estimated as percentages of revenue, they also grew at the perpetuity rate. The only element of the FCFF that suffered relevant changes compared to what was done for the projection period's Cash Flows was CAPEX, as it is considered that in perpetuity CAPEX will cover depreciation while also growing at the perpetuity rate.

Regarding the rate at which the company is expected to grow in perpetuity, it was decided to use the long-term world GDP growth of 2.47%, according to *OECD* estimates, as a proxy for the Pirelli's perpetual growth. Considering that Pirelli sells its products worldwide, it made sense to consider a broader and less optimistic perpetuity rate, as it is impossible for a firm to keep growing at the rate at it is currently growing or at the growth rate of the industry in which it operates.

6.2.4. Conclusion

With all the projected period Cash Flows and Terminal Value computed, the only thing left to do was to sum them to reach the Enterprise Value. This valuation retrieved an Enterprise Value of €9,704 million for Pirelli. After determining the Enterprise Value, it was now possible to reach the Equity Value and consequently the share price of Pirelli by considering the effect of Net Debt, Other Assets and Liabilities and Income attributable minority interest.

Regarding Net Debt, it was assumed that the Borrowings amount would remain constant for 2019 since there is no indication that it will change in the foreseeable future. Cash was estimated based on a percentage of Revenues, being applied the percentage of 2018. Moving on, all components of Other Assets and Liabilities were estimated for 2019 by following the same evolution pattern of the historical period. It is vital to mention that Financial Assets are a significant component of Other Assets, and these have been taking part in the balance sheets of companies in a number of sectors more often than in previous years, as they are nowadays a relatively safe investment and good to help diversify forms of income. Last but not least, Net Income attributable to minority interest was projected for 2019, as a percentage of EBIT, applying the same ratio of 2018. The tables above help understand better the calculations made to estimate all components necessary to reach Equity Value.

In the end, this valuation retrieved an Equity Value of €5,285 million, and as Pirelli is divided into a vast number of shares, 1 billion, the price per share projected by this DCF valuation for 31 of December of 2019 is €5.28.

Figure 33: DCF Model Conclusion

	2019
Enterprise Value	9,704
EV / EBITDA	8,86x
(+/-) Net Cash / Net Debt	-3,205
(+/-) Other assets and liabilities	-1,206
(-) Minorities	-9
Equity Value @ 31 Dec 2019	5,285
Number of shares (in million)	1,000
Price per Share	5.28

Source: Own Calculations

6.3. Relative Valuation

6.3.1. Peer Selection

Pirelli, like most companies, divides its peers into three levels of tiers, with peers belonging to tier 1 having characteristics more similar to Pirelli and more direct competitors, and peers with different characteristics belonging to tier 3. Also, Pirelli considers all tyre manufacturers that produce tyres dedicated to cars or motorcycles as peer companies.

According to Pirelli's own analysis, tier 1 is composed of five different competitors: Nokian Tyres Plc, Bridgestone Corp, Michelin Sca, Goodyear Tire & Rubber Co, and Continental Ag. Additionally, Pirelli divides tier 1 into two different groups.

The first one is composed solely by Nokian, as this is the only tyre manufacturer with a similar EBITDA margin compared to Pirelli, which is superior to 18%. The second group is composed by the remaining four tyre producers, as all have similar EBITDA margins of around 11%. Nokian, despite having similar EBITDA margins, has a business model distinct from Pirelli, as it focuses its tyre production on mostly winter tyres while Pirelli focuses on the High-Value segment. Still, compared to Pirelli, Nokian is more of a Regional Company, with 60% of its sales coming from Nordic countries and Russia. Also, it allocates a much smaller amount of its Revenues to R&D compared to Pirelli, with Pirelli allocating 4.1% in 2018 and Nokian just 1.3%. In terms of similarities, both companies' production is done mostly on "low-cost" countries, and both sell their products through a solo brand.

The other companies that compose tier 1 are all "Full-Liners" with a tyre offering for all market segments, having multiple tyre brands apart from the brand that goes by the name of the corporation. Additionally, these tier 1 peers allocate a smaller portion of its Revenues to R&D compared to Pirelli and are less consumer-focused than Pirelli and have most of its production being done on "high-cost" locations. Regarding resemblances, just like Pirelli, the Replacement segment is responsible for around 75% of the "Full-Liners" sales and revenues are distributed worldwide.

Combined, the five tyre manufacturers that are part of tier 1 plus Pirelli were responsible for 49% of all sales in 2018.

Next, tier 2 is composed of 14 different tyre producers, with the most notorious being the Asian Hankook Tire & Technology Co Ltd and Yokohama Rubber Co Ltd. Companies belonging to tier 2 are considered as “Mass Market” and have, on average, EBITDA margins of around 10%.

Finally, tier 3 is composed by more than 150 tyre producing players and are companies specialized in the “Low Cost” segment, as a consequence of their market positioning, EBITDA margins of these producers are lower, ranging between 7% and 9%.

As it is evident by the presentation of Pirelli’s peer companies above, Pirelli differs from the rest by having a unique business model resulting in a weak peer group, which consequently hurts any Relative Valuation performed on Pirelli.

Having in consideration the tier description done above, it was decided to exclude companies that belong to tier 2 and tier 3 and just consider the companies that belong to tier 1 to perform the Relative Valuation of Pirelli, as tyre producers in tier 2 and 3 have financial ratios and business models quite different from Pirelli and including these dissimilar companies would not retrieve a fair Relative Valuation of Pirelli.

Figure 34: Pirelli’s Peer Companies

Peers	Area of Operation		Mkt Cap in €billion	Revenues in €million	Revenues Growth CAGR(2014-2018)	ROIC	Gross Margin
	Europe	RoW					
Sub-tier 1							
NOKIAN TYRES	66.8%	33.2%	3.32	1,596	3.5%	18.7%	45.8%
Sub-tier 2							
MICHELIN	38.9%	61.1%	18.99	22,028	3.0%	7.8%	32.3%
CONTINENTAL	48.3%	51.7%	23.48	44,404	6.5%	12.6%	25.0%
Sub-tier 3							
GOODYEAR	43,3% ¹	56.7%	3.29	13,120	-1.0%	6.0%	22.7%
BRIDGESTONE	17.6%	82.4%	25.71	28,022	1.7%	10.2%	37.8%
PIRELLI	43.0%	57.0%	5.1	5,195	2.8%	4.60%	48.70%

Source: Own Analysis

6.3.2. Multiple Valuation

After determining the peer group, the following step was to decide which multiples would be more appropriate for valuing Pirelli. First of all, it was determined to use forward multiples since those are considered by many as a better tool to use in a Relative Valuation. After that, the first multiple chosen was the P/E multiple, as it is the most commonly used multiple, yielding quality results when applied to a relatively stable firm. Also, this multiple is considered to be easy to understand by most. In addition, as the capital structure of Pirelli is not expected

to change dramatically, the results yielded by this multiple should be reliable. Two other multiples used were enterprise value multiples: EV/EBITDA and EV/Sales. EV/EBITDA multiple is regarded as a good multiple to use as EBITDA is the closest accounting figure to the actual operating Cash Flows generated by a company, as items such as depreciation, amortization, interest and taxes are not related to a company's cost of operating its business. Additionally, EV multiples allow comparing companies with different capital structures, which is convenient for this analysis, as peer companies differ in that aspect from Pirelli. Lastly, the EV/Sales multiple was used, as revenues is a hard accounting figure to manipulate by managers unlike earnings. Besides, this multiple is not as volatile when compared to other earnings multiples, making this multiple the right choice for this valuation.

Figure 35: Peer's Multiples

Peers	Price/Earnings	EV/EBITDA	EV/Sales
Sub-tier 1			
NOKIAN TYRES	10.41	8.79	2.39
Sub-tier 2			
MICHELIN	10.45	5.44	1.04
CONTINENTAL	11.43	5.32	0.67
Sub-tier 3			
GOODYEAR	11.52	5.84	0.65
BRIDGESTONE	11.23	6.22	1.01
Average	11.01	6.32	1.15
Median	11.23	5.84	1.01
Minimum	10.41	5.32	0.65
Maximum	11.52	8.79	2.39

Source: Thomson Reuters Eikon

Figure 36: Pirelli's Relative Valuation

	Price/Earnings	EV/EBITDA	EV/Sales
Multiple From The Peers Sample	11.01	6.32	1.15
Pirelli's Financial Indicators	0.44	1032.67	5312.79
Enterprise Value - Multiple Valuation	9263.28	6528.57	6120.33
(+/-) Net Cash / Net Debt	3205.09	3205.09	3205.09
(+/-) Other Assets and Liabilities	1205.77	1205.77	1205.77
(-) Minorities	8.90	8.90	8.90
Equity Value - Multiple Valuation	4843.52	2108.81	1700.57
Share Price - Multiple Valuation	4.84	2.11	1.70

Source: Own Analysis

As it is made clear by the tables above, all the multiples chosen undervalue Pirelli by a large margin compared to the DCF valuation performed and also compared to Pirelli's current stock price. More specifically, only the P/E multiple enabled to reach a value somewhat close to what was computed in the DCF valuation, while the values for Pirelli retrieved by applying the EV/EBITDA and EV/Sales multiples were very distant from the DCF valuation.

This was expected, as even Pirelli's closest competitors, which were chosen to form the peer group for this Relative Valuation, widely differ in terms of EBITDA margin and business model.

To conclude, considering what was said above, the results reached by the Relative Valuation approach will be disregarded, and considered only the result provided by the DCF valuation method.

6.4. Sensitivity Analysis

An Equity Valuation requires the use of assumptions in order to apply valuation models. Knowing that in most cases assumptions might not entirely reflect reality, it is a good practice to understand how changes in the different inputs used to construct, in this case, a DCF valuation model, might affect the result generated. To quantify the changes, two sensitivity analysis were performed. The first one assesses the effect of a change in the WACC and terminal growth used to discount the FCFF and TV obtained in the DCF valuation. The second one considers fluctuations in the main Revenue drivers, Product & Mix and Price & Mix. Regarding the first, the variations of the WACC are caused by a variation in Pirelli's Beta, since the cost of equity is the highest contributor to the overall WACC, as a consequence of today's healthy economy allowing for low debt cost. Additionally, Beta fluctuations, which can happen more frequently than changes in other WACC variables, have a tremendous impact in the WACC. In just 2018 alone, according to the Thomson Reuters Eikon software, the beta varied from 0.72 to 1.29, which demonstrates the volatility of this input and why it is relevant to consider that in this valuation.

Figure 37: WACC & Perpetual Growth Sensitivity Analysis

		Wacc						
		0.9	0.95	1	1.05	1.1	1.15	1.2
Growth	SP = 5.28	6.41%	6.65%	6.88%	7.12%	7.21%	7.60%	7.83%
	2.07%	6.58	6.03	5.53	5.08	4.73	4.30	3.96
	2.27%	6.99	6.39	5.86	5.38	5.00	4.54	4.17
	2.47%	7.44	6.79	6.21	5.69	5.28	4.79	4.41
	2.67%	7.95	7.24	6.60	6.04	5.60	5.07	4.66
	2.87%	8.51	7.72	7.03	6.42	5.94	5.37	4.93

Source: Own Analysis

The Figure above showcases how fluctuations in the WACC, and terminal growth rate influence the stock price generated by the DCF valuation of Pirelli. The row of numbers above the WACC refers to the Betas used to retrieve the WACC below.

It is made clear by this table that minor changes in either the WACC or perpetual growth rate have a meaningful impact on the share price of Pirelli, since it is very dependent of the Terminal Value, which is largely dependent on the two variables being tested.

Figure 38: Tyre Units Growth Sensitivity Analysis

	Tyre Units Growth Decrease by 2022			
	-1%	-1.25%	-1.5%	-1.75%
Price per Share	5.28	4.69	4.39	4.12

Source: Own Analysis

Figure 39: Price & Mix Growth Sensitivity Analysis

	Price & Mix Growth Decrease by 2022			
	-0.5%	-0.75%	-1.0%	-1.25%
Price per Share	5.28	4.92	4.68	4.44

Source: Own Analysis

The tables above portray the effect of variations in the two main Revenue Drivers, Product & Mix and Price & Mix, on Pirelli's stock price. The table to the left demonstrates that if the effect of the slowdown of the automotive industry on the evolution of units sold by 2022 is more than just a negative 1%, the share price goes down by a significant margin. The same can be said for Price & Mix Revenue driver, which is displayed on the table on the right.

In conclusion, performing a sensitivity analysis to the most critical assumptions made to construct the DCF valuation enabled to understand that marginal changes to the assumptions made could significantly alter the share price of 5.28€ estimate for Pirelli by the end of the year.

7. Valuation Comparison

Figure 40: Investment Bank Comparison - FCFF

	2019E	2020E	2021E
Dissertation	448	496	480
<i>FCFF change (%)</i>		10.7%	-3.2%
Banca IMI	428	536	529
<i>FCFF change (%)</i>		25.2%	-1.3%

Source: Banca IMI and Own Analysis

The table above shows the FCFF for the period 2019-2021 of this dissertation against the FCFF computed by Banca IMI's equity research. The evolution of the FCFFs of both pieces of research occurs in a similar matter, with an increase from 2019 to 2020 and a decrease from 2020 to 2021. Despite evolving in a similar matter, this dissertation considers a higher FCFF in 2019, mainly due to assuming a lower CAPEX and DA expenses. One can consider this dissertation to be a little more realistic since it is based on more recent information, provided by Pirelli, about 2019's financial performance. As for the following two years, both FCFFs estimated by Banca IMI are higher than the FCFFs estimated in this dissertation as Banca IMI believes that CAPEX and DA expenses will decrease with time, while this dissertation considers precisely the opposite. Interestingly, regarding Revenues, this dissertation is in line with what is projected by Banca IMI.

A FCFF comparison for the projected years 2023 and 2024 cannot be done, as there are no FCFF estimations for those years. Usually, investment banks do not forecast periods far ahead in the future due to the high unpredictability of such forecasts.

Figure 41: Investment Bank Comparison – WACC Components

	Dissertation	Banca IMI
Risk Free Rate	-0.30%	1.75%
Levered Beta	1.07	1.10
Risk Premium	9.12%	7.00%
Cost of Equity	12.49%	9.2%
Cost of Debt	1.70%	5.00%
D/EV	48%	38%
E/EV	52%	62%
Tax Rate	24.3%	28%
WACC	7.33%	7.60%

Source: Banca IMI and Own Analysis

The WACC computed in this dissertation is lower by 24 basis points in comparison to Banca IMI's WACC estimation. The leading causes for this difference are the risk-free, market risk

premium, effective tax rate and long-term capital ratio. Banca IMI does not specify how they reached these WACC drivers, so it is not possible to compare this dissertation's WACC components reasoning against Banca IMI's. It is only possible to say that Banca IMI believes that Pirelli will unleveraged itself over time while this dissertation considers that it will keep constant. Banca IMI assumption regarding the long-term capital structure is reasonable, as the favourable interest rate environment should not last forever, and as a consequence, firms most likely will use less debt as a form of financing. On the other, Pirelli does not have any plans regarding the way it plans to finance itself in the future, and consequently, in this dissertation, it was chosen to go through the safest route by considering a permanent capital structure. Ultimately, both the cost of equity and cost of debt estimated in this dissertation differ from Banca IMI's.

Figure 41: Investment Bank Comparison – Recommendation

	Dissertation	Banca IMI
# Shares Outstanding	1,000	1,000
Enterprise Value	9704	9815
Value of Equity	5,285	6,223
Price per Share (29th November 2019)	5.15	5.41
Implied Fair Price	5.28	6.10
Recommendation	BUY	BUY

Source: Banca IMI and Own Analysis

Finally, in terms of the final recommendation comparison, this dissertation advises that investors should buy Pirelli's stock but having in mind that there is only a 2.5% upside when buying Pirelli's stock, while Banca IMI's advises buying based on a much higher upside.

8. Conclusion

The main objective of this dissertation is to provide investment advice regarding Pirelli & C Spa stock. Two valuation approaches were utilized in this dissertation, the first one being the Discounted Cash Flow model, being discounted at the WACC, and the second one being a Relative Valuation, through a multiples' analysis. This dissertation provides investment advice based on a single method, the DCF model, as due to the distinctiveness of Pirelli's business model and EBITDA margin was difficult to consider any of its competitors as suitable peers. Therefore, this led to a poor relative valuation, yielding stock prices for Pirelli ranging from

€1.7 and €4.8, showing discrepancy. As a consequence, the Relative Valuation was not suitable for giving any investment advice or to serve as a comparison to the DCF valuation.

To understand how any small variation to the most important assumptions made could affect the stock price, it was built a sensitivity analysis for the DCF approach. Additionally, it was important to see the effect on the stock price if the slowdown of the automotive industry proves to lower even more demand for tires.

The fair value estimated for Pirelli's share at the end of 2019 is €5.28. Given that Pirelli's stock is trading at €5.15 as of 29th November 2019, and assuming that a firm's stock price should reflect, at some point in the future, its fair value, the investment recommendation that this dissertation provides is that investors should hold Pirelli's stock as the market is currently trading at a price very close to the fair value.

Last but not least, it should be acknowledged that after a period of restructuring dropping its industrial tyre segment, Pirelli has shown resilience and a desire to serve its customers better than its competitors, being the only tyre producer dedicated to the HV segment. Management has demonstrated to be actively working on making Pirelli become more efficient in the future by divesting in the less profitable Standard segment and investing in the more profitable HV segment while investing in R&D to discover ways of cutting costs while maintaining Pirelli's renowned high quality. This valuation does not incorporate the premium, consequent of Pirelli's right management decisions and adequacy of its business model to industry drivers that most investment banks and researchers include in Pirelli's share price. Nonetheless, it is predicted that massive competition should come from competitors such as Michelin and Continental, as these manufacturers are investing more R&D money every year in developing tyres for the HV segment.

9. Appendixes

9.1. Car Parc Forecast

According to Pirelli Car Parc, evolution is directly correlated with the demand for tyres, affecting, in the short run, the demand of the O.E. segment in the long run the Replacement segment demand. For the future, car production is expected to slow down, which directly reduces the number of tyres produced and sold by tyre manufacturers.

As it is demonstrated in the tables above, the slower growth of the global car parc results in a smaller CAGR for the projected period of 2019-2022 when compared to the previous 2016-2019 CAGR.

Figure 43: Global Car Parc Evolution (2016-2022)

	2016H	2017H	2018H	2019P	2022P
Car Parc					
Total	1,281	1,332	13,882	1,428	1,565
Premium & Prestige	133	141	149	157	182

Source: Pirelli's November Presentation

Figure 44: Total Car Parc CAGR

Total CAGR	
2016-2019	4%
2019-2022	3%

Source: Pirelli's November Presentation

Figure 45: Premium & Prestige Car Parc CAGR

Premium & Prestige CAGR	
2016-2019	6%
2019-2022	5%

Source: Pirelli's November Presentation

9.2. Pirelli's SWOT Analysis

Pirelli operates in a mature industry that has not endured any relevant changes for decades. The high barriers lifted by the experienced players hidden behind giant economies of scale, countless capital spilled on technology, and the lack of substitutes are strengths that characterize the industry. The global trend of emerging markets growth and infrastructures development, the electric cars and even safety regulations are opportunities on a reinsuring future for the

organizations. Due to a highly competitive industry environment, arising from low product diversification and significant exit barriers, profitability margins tend to be lower. Higher regulatory pressures and legal requirements derived from growing global environmental awareness can harm the current industry profitability. Moreover, the double effect of oil, both as a raw material input for synthetic rubber and as a critical driver for car usage, constitutes a threat to the industry.

9.3. Porters Five Forces

Competition within the Industry (High)

This is an industry moderately concentrated, with top 5 market companies having a concentration ratio of roughly 50%. Low levels of product differentiation, within each segment, translates in competition on prices.

Companies are now trying to gain an advantage over competitors by investing in other parameters such as performance, reputation and customer service. Decreasing operating margins due to the competitive environment and growing influence of low-cost Asian competitors means the industry profitability is dependent on input prices.

Bargaining Power of Buyers (Moderate)

Contractual agreements for Original Equipment Manufacturers (OEM's) influence positively the bargaining power of suppliers. Not only the price of tyres remains stable, irrespectively of market price, but also Original Equipment Manufacturers are able to negotiate prices due to their scale.

Moreover, on the Replacement market, large retail chains are able to put pressure to lower prices when buying in larger quantities. However, dispersed small size buyers cannot achieve such bargaining power.

Overall, buyers do not have viable substitute products to tyres, but low switching costs make it easy for them to change between different tyre brands, resulting in moderate bargaining power.

Bargaining Power of Suppliers (Moderate)

The manufacturing and processing of both natural and synthetic rubber is dominated by a few large world players. Hence, the existence of cartels for natural rubber and petroleum such as OPEC translates in higher bargaining power of suppliers.

Tyre production is highly sensitive to price fluctuations of rubber and other petroleum derivatives since it is dependent on large amounts of those raw materials. There is a correlation between oil prices and rubber prices (figure 23) and, as explained before, the increase in oil price increases syntactic rubber price. This will result in the utilization of higher percentages of natural rubber in tyre production which will ultimately lead to a natural rubber price increase.

To mitigate the dependence on some providers of raw materials, some manufacturers started to perform backward integration, as in the case of Goodyear, where the company produces some percentage of its rubber needs. Accordingly, this leads to the moderate bargaining power of suppliers.

Threat of New Entrants (Low)

The industry has high barriers to entry. In general terms, most tyres are relatively undifferentiated, meaning that companies to be profitable, need to produce in large quantities to achieve economies of scale. High capital expenditures are required, so it is challenging for new entrants to match the scale of the existing producers. Furthermore, a substantial amount of R&D is required to develop and test new tyre models, whose approvals are difficult and costly to get due to strict legal and safety regulations. Brand recognition makes it difficult to enter the market with an unknown product, contributing to a low threat of new entrants.

Threat of Substitutes Products (Low)

There are no viable substitutes for tyres. However, it is necessary to take in consideration that a higher environmental awareness could lead individuals towards the usage of public transportation, which would affect the number of vehicle usage, leading to a corresponding decrease in demand for tyres. Counterfeit tyres small market share and low expectations of growth do not represent a significant threat to the industry.

9.4. Raw Materials

According to Pirelli's November Company Presentation, the main boosters of costs are natural rubber and synthetic rubber. Natural rubber is obtained through rubber trees, which requires warm climates. While synthetic rubber can be produced from petrochemical feedstock with crude oil and butadiene as the primary inputs.

Accordingly, an increase in the oil price/butadiene leads to more costly synthetic rubber, which increases demand for natural rubber and makes it more expensive.

When looking at 2018 numbers, variations were characterized by increases in the price of energy resources and butadiene (main raw material in synthetic rubber production) and a decrease in the price of natural rubber.

Brent Oil

Recorded an average price for the year of \$72 per barrel, representing an increase in +31.0% compared to the average price in 2017. Despite that, oil price closed the year on a downfall with December averaging \$58 per barrel. In the 1H2019, Brent prices averaged \$64 per barrel and the U.S. Energy Information forecasts the price to be around \$65 per barrel, maintaining a price range similar to the first half of the year.

Butadiene

Closed 2018 with an annual average of €1011/ton, which was a drop of 10% compared to the annual average price in 2017 (€1112/ton). The downward trend continued in the 1H2019 with butadiene prices reducing, and a similar behaviour is expected for the rest of the year. The commodity is forecasted to average close to €950/ton in 2019.

Natural Rubber

Prices are bouncing back after a sharp decline in 2018. The commodity closes the previous year averaging \$1365 per ton, which represented a price fall of 20% relative to 2017YE, where Natural Rubber price was \$1651/ton on average. Relative to the 1H2019, a recovery was felt, and the price is expected to average \$1450 per ton in 2019.

Due to its unpredictability and prices dependent what deals Pirelli is able to negotiate with its suppliers, the effect of the projected raw material prices was not considered in this valuation, but those could have a profound impact in Pirelli’s valuation if any large price fluctuations were to happen in the future.

9.5. Forex Impact

As a significant part of Pirelli’s revenues are generated by sales in volatile emerging markets, Pirelli can have gains or losses related to forex exchange. For 2019, Pirelli has already confirmed in its November Company Presentation that in 2019 Forex will not have any impacts in the revenues of the firm. Considering the high unpredictability of foreign exchange fluctuations and lack of forecasts and research on this matter, it was decided to consider the 2019 Forex impact for the remaining of the projected period (2020-2024).

9.6. Market Risk Premium Calculations

Since Pirelli’s sales come from all parts of the globe, it was not a good practice to consider just one Market Risk Premium (MRP) to be applied in the CAPM formula. Since there is no information regarding Revenue per country, it was just possible to apply the MRP of the six regions in which Pirelli sells its products and then apply a weighted average based on the weight of each region in the overall revenue amount and each region’s MRP.

Figure 46: Market Risk Premium Calculations

	% Sales	MRP
Europe	43.01%	9.17%
NAFTA	19.33%	6.52%
Asia/Pacific (APAC)	17.14%	9.67%
Latin America	13.32%	11.08%
Middle East/Africa/India	3.99%	11.90%
Russia and CIS	3.22%	9.43%
Weighted Average		9.12%

Source: Damodaran’s Website and 2018 Pirelli Annual Report

9.7 Beta Calculations

Beta is used to measure an asset's risk compared to a benchmark. Determining the Beta of a company is a process that requires a number of decisions to be made.

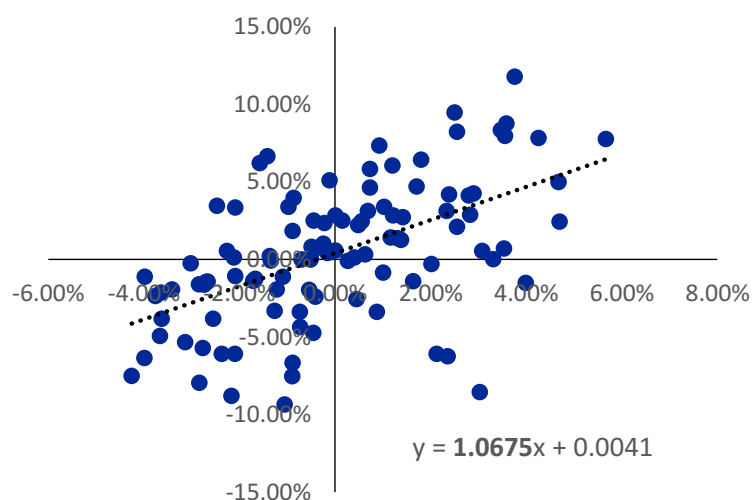
The first one concerns the choice of market index to use as a benchmark of the market portfolio. As it was said in a previous section, The Borsa Italiana was chosen as the market benchmark for Pirelli as Pirelli is an Italian Company traded in the Borsa Italiana.

The second decision has to do with the return interval, which can be daily, weekly or monthly. According to Damodaran (1999), the best interval to use is monthly, as Betas estimated with shorter return intervals can have significant biases caused by non-trading issues.

The third and last decision has to do with the period of analysis, which in Pirelli's case, the third decision was limited to a maximum of two year period. The period limitation influences the choice of return interval, as applying a longer interval in just two years of financial data would return a beta based on a limited number of observations.

In the end, Pirelli's Beta was estimated by performing a regression on two years of weekly returns of MIB and Pirelli, resulting in a sample of 104 returns for each security. Figure 46 contains the regression run, which resulted in a beta of 1.07

Figure 47: Estimated 2Y Beta



Source: Yahoo Finance for Prices

9.8. Interest Coverage Ratio and Cost of Debt Calculations

Netflix's cost of debt was computed as a function of the firm's credit rating since there was no rating provided by a reliable Credit Rating Company it was necessary to calculate Pirelli's Interest Coverage. After dividing Pirelli's 2019 expected EBIT by 2019's expected interest expense, resulting in an ICR of 2.98, it was determined that Pirelli has a rating equivalent to Ba2/BBB. On the table below can be seen that, for mature companies with a market cap superior to \$5 billion in the Ba2/BBB rating bracket, the appropriate spread over the risk-free rate is 2%. As a result, Netflix's cost of debt was assumed to be 1.7% (-0.298% (rf) + 2% (spread)).

Figure 48: Ratings, Interest Coverage Ratios and Default Spread

If interest coverage ratio is			
>	≤ to	Rating is	Spread is
-100000	0.199999	D2/D	19.38%
0.2	0.649999	C2/C	14.54%
0.65	0.799999	Ca2/CC	11.08%
0.8	1.249999	Caa/CCC	9.00%
1.25	1.499999	B3/B-	6.60%
1.5	1.749999	B2/B	5.40%
1.75	1.999999	B1/B+	4.50%
2	2.249999	Ba2/BB	3.60%
2.25	2.49999	Ba1/BB+	3.00%
2.5	2.999999	Baa2/BBB	2.00%
3	4.249999	A3/A-	1.56%
4.25	5.499999	A2/A	1.38%
5.5	6.499999	A1/A+	1.25%
6.5	8.499999	Aa2/AA	1.00%
8.50	100000	Aaa/AAA	0.75%

Source: NYU Stern

9.9 Financial Statements Forecast

Figure 49: Income Statement

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Sales and Services rendered	4,976	5,352	5,195	5,313	5,451	5,612	5,799	6,037	6,331
COGS	(2,547)	(2,751)	(2,665)	2,725	2,796	2,879	2,975	3,097	3,248
Gross Margin	2,430	2,601	2,529	2,588	2,655	2,733	2,824	2,940	3,083
<i>GM (%)</i>	48.8%	48.6%	48.7%	48.7%	48.7%	48.7%	48.7%	48.7%	48.7%
Staff Costs	(1,135)	(1,205)	(1,062)	(1,110)	(1,140)	(1,176)	(1,210)	(1,246)	(1,281)
Other OPEX	(265)	(351)	(372)	(445)	(457)	(470)	(486)	(506)	(530)
EBITDA	1,029	1,045	1,095	1,033	1,059	1,087	1,128	1,189	1,272
<i>Ebitda (%)</i>	20.7%	19.5%	21.1%	19.4%	19.4%	19.4%	19.5%	19.7%	20.1%
Depreciation and amortization	(342)	(371)	(394)	(409)	(431)	(454)	(477)	(500)	(522)
EBIT	687	674	701	624	627	632	651	689	751
Interest income	43	17	17	17	17	18	18	19	20
% Financial Assets	12%	4%	5%	5%	5%	5%	5%	5%	5%
Interest expense	(470)	(357)	(197)	(209)	(209)	(209)	(209)	(209)	(209)
% Gross Debt	7%	8%	4%	4%	4%	4%	4%	4%	4%
Others	(20)	(30)	(19)	(18)	(18)	(19)	(19)	(20)	(22)
% EBITDA	2%	3%	2%	2%	2%	2%	2%	2%	2%
EBT	239	304	502	414	417	422	441	478	539
Taxes	(75)	(41)	(53)	(44)	(44)	(45)	(47)	(50)	(57)
Effective Tax Rate (%)	31%	13%	11%	11%	11%	11%	11%	11%	11%
Extra Items	(16)	(88)	(6)	(5)	(5)	(5)	(6)	(6)	(7)
% EBT	7%	29%	1%	1%	1%	1%	1%	1%	1%
Net income	148	176	442	365	367	372	389	421	475
Attributable to non-controlling interests	(13)	1	(11)	(9)	(9)	(9)	(9)	(10)	(12)
% Net Income	9%	0%	2%	2%	2%	2%	2%	2%	2%
Net income to common shareholders	135	176	432	356	358	363	379	411	464

Interest Expense for the Projection Period is determined by doing an average of the interest rate paid by Pirelli.

Figure 50: Balance Sheet (Assets)

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Current assets									
Cash and Short Term Investments	1,533	1,118	1,327	1,368	1,404	1,445	1,493	1,554	1,630
Total Receivables	989	1,052	1,053	1,015	1,036	1,061	1,090	1,130	1,180
Trade Receivables	679	652	628	637	648	662	678	700	728
Other Receivables	246	364	384	339	348	358	370	385	404
Financial Receivables	30	37	33	34	35	36	37	38	40
Tax Receivables	64	35	41	39	40	41	43	45	48
Total Inventory	1,056	941	1,128	1,153	1,183	1,218	1,259	1,311	1,374
Other current assets	73	61	126	129	132	136	140	146	153
Derivative Financial Instruments	24	28	99	101	103	106	110	115	120
Other Financial Assets at FVTIS	-	-	27	28	29	29	30	32	33
Securities held for trading	49	33	-	-	-	-	-	-	-
	3,651	3,172	3,634	3,665	3,755	3,860	3,983	4,141	4,337
Non current assets									
Property, plant and equipment	3,557	2,980	3,093	3,182	3,262	3,332	3,391	3,439	3,473
Intangible assets	6,497	5,894	5,783	5,666	5,544	5,416	5,283	5,146	5,003
Investments in associates and J.V.	47	17	73	74	76	18	19	20	21
Other financial assets	199	230	-	-	-	-	-	-	-
Other financial assets at fair value through other comprehensive income	-	-	69	70	72	74	77	80	84
Other financial assets at fair value through income statement	-	-	-	-	-	-	-	-	-
Deferred tax assets	148	112	74	70	72	74	76	80	86
Other receivables	131	109	103	118	121	125	129	134	141
Financial Receivables	96	95	124	108	110	114	118	122	128
Tax receivables	12	27	16	15	16	16	17	18	19
Derivative financial instruments		1	20	21	21	22	22	23	25
	10,686	9,465	9,355	9,324	9,294	9,190	9,132	9,062	8,979
Assets Held for Sale		61	11	-	-	-	-	-	-
Total Assets	14,337	12,697	12,989	12,988	13,048	13,050	13,115	13,203	13,316

Investment in associates and Joint Ventures is mainly influenced by Xushen Tyre (Shangai) Co.'s, a subsidiary of Pirelli, ramp up phase, which will end in 2020, so the investment will be the same in 2019 and 2020 and from 2021 and after it will return to normal 2017 values.

Assets held for sale represent in the Historical Period a Chinese plant, which was sold in the beginning of 2019

Figure 51: Balance Sheet (Financial Assets)

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Financial Assets	367	386	339	327	336	346	357	372	390
Derivative Financial Instruments	24	28	99	101	103	106	110	115	120
Other Financial Assets at FVTIS	-	-	27	28	29	29	30	32	33
Securities held for trading	49	33	-	-	-	-	-	-	-
Other financial assets	199	230	-	-	-	-	-	-	-
Other financial assets at fair value through other comprehensive income	-	-	69	70	72	74	77	80	84
Financial Receivables	96	95	124	108	110	114	118	122	128
Derivative financial instruments	-	1	20	21	21	22	22	23	25

Figure 52: Balance Sheet (Equity)

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Equity									
Share capital	1,342	1,904	1,904	1,904	1,904	1,904	1,904	1,904	1,904
Reserves	1,785	2,097	2,204	2,019	1,963	1,824	1,717	1,574	1,388
Net Income	148	176	442	365	367	372	389	421	475
Total Equity	3,275	4,177	4,551	4,288	4,234	4,100	4,010	3,900	3,768

Figure 53: Balance Sheet (Liabilities)

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Non current liabilities									
Borrowings from banks and other financial institutions	5,946	3,897	3,929	3,929	3,929	3,929	3,929	3,929	3,929
Other payables	87	74	83	84	83	88	90	94	99
% Revenues	2%	1%	2%	2%	2%	2%	2%	2%	2%
Provisions for liabilities and charges	171	127	138	143	147	151	156	160	165
% Staff Costs	15%	11%	13%	13%	13%	13%	13%	13%	13%
Provisions for deferred tax liabilities	1,452	1,217	1,082	1,020	1,045	1,073	1,114	1,174	1,256
% Differed Tax Assets	981%	1091%	1459%	1459%	1459%	1459%	1459%	1459%	1459%
Employee benefit obligations	368	274	224	234	241	248	256	263	271
% Staff Costs	32%	23%	21%	21%	21%	21%	21%	21%	21%
Tax payables	3	2	2	2	2	2	2	2	2
% EBITDA	0%	0%	0%	0%	0%	0%	0%	0%	0%
Derivative financial instruments	-	55	16	16	17	17	18	19	20
% Revenues	0%	1%	0%	0%	0%	0%	0%	0%	0%
	8,028	5,647	5,475	5,429	5,464	5,510	5,565	5,641	5,742
Current liabilities									
Borrowings from banks and other financial institutions	642	559	800	800	800	800	800	800	800
Trade payables	1,498	1,674	1,605	1,688	1,746	1,812	1,884	1,971	2,072
Other payables	783	565	437	615	631	649	671	698	732
% Revenues	16%	11%	8%	12%	12%	12%	12%	12%	12%
Provisions for liabilities and charges	46	46	34	41	42	43	45	46	47
% Staff Costs	4%	4%	3%	4%	4%	4%	4%	4%	4%
Employee benefit obligations	42	-	5	6	6	6	6	6	7
% Staff Costs	4%	0%	1%	1%	1%	1%	1%	1%	1%
Tax payables	52	48	66	62	63	65	67	71	76
% EBITDA	5%	5%	6%	6%	6%	6%	6%	6%	6%
Derivative financial instruments	-	18	60	61	63	64	67	69	73
% Revenues	0%	0%	1%	1%	1%	1%	1%	1%	1%
	3,064	2,910	3,006	3,272	3,350	3,440	3,540	3,662	3,807
Total Liabilities	11,092	8,557	8,481	8,701	8,814	8,950	9,106	9,303	9,548
Total Shareholders equity & Liabilities	14,367	12,734	13,032	12,988	13,048	13,050	13,115	13,203	13,316

The Balance Sheet item called Provisions for Liabilities and charges is composed mainly by labor disputes and as such it was projected as a percentage of staff costs, applying 2018's ratio (13%) for the totality of the Projection Period.

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