



INSTITUTO  
UNIVERSITÁRIO  
DE LISBOA

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## **Equity Research of Hilton Worldwide Holdings Inc.**

José Pedro Rodrigues de Almeida

Master of Science in Finance

Supervisor:

Professor António Sarmento Gomes Mota, Department of Finance  
ISCTE Business School

September, 2022





**BUSINESS  
SCHOOL**

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Department of Finance

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## **Agradecimentos**

Este projeto de mestrado representa o culminar de um percurso académico pelo qual me orgulho bastante. Apesar de nem sempre terem sido tomadas as melhores decisões, tendo sido várias as vezes em que tropecei, sempre fui capaz de reerguer-me e de dar a volta por cima.

No entanto, sou da opinião que tudo aquilo que alcancei durante o meu percurso académico se deve não só ao meu esforço, como também ao facto de estar rodeado de seres humanos incríveis que me potenciam a cada momento, não tendo sido este projeto de mestrado uma exceção à regra.

Gostaria de começar por agradecer ao professor António Gomes Mota que mais do que me ter orientado durante a realização deste projeto de mestrado, apresentou-me o mundo das finanças empresariais e ensinou-me tudo aquilo que sei hoje, por tudo isso o meu eterno agradecimento.

Em seguida gostaria de agradecer aos meus pais, devo-lhes todo o meu sucesso, pois sem o seu grande esforço nada disto poderia se ter tornado real. Gostaria também de agradecer à minha irmã e aos meus amigos mais chegados, por terem-me dado toda a confiança necessária sempre que eu duvidei de mim. Por fim, mas não menos importante, gostaria de agradecer à minha namorada. Ela, mais do que ninguém, soube desde o princípio quais eram os meus objetivos e ajudou-me a alcançá-los.

Deixo ainda um especial agradecimento a todo o corpo docente do ISCTE-IUL. Sou grato pelo que vivi nesta casa e levo comigo tudo aquilo que aqui aprendi. Talvez não seja um adeus, mas sim um até já.



## **Resumo**

Este projeto de mestrado consiste na avaliação da Hilton Worldwide Holdings e o seu principal propósito é definir o preço-alvo das ações para o final do ano de 2020. Além disso, visa fornecer aos investidores uma recomendação de investimento baseada na diferença entre o preço de fecho verificado e o preço-alvo da ação obtido durante este exercício de avaliação.

Ao longo do último século, estando presente em todo o mundo, a Hilton tornou-se um nome altamente reconhecido e respeitado na indústria da hospitalidade. Em 2020 a empresa enfrentou um grande desafio, inicialmente devido à suspensão temporária da maioria dos negócios com os vários confinamentos, e depois com a readaptação ao que o futuro implicará. Neste momento, a Hilton está a cargo da difícil tarefa de se recuperar num mundo cheio de incertezas.

De forma a realizarmos este exercício de avaliação aplicámos um modelo da abordagem de Fluxos de Caixa Descontados, o *Free Cash Flow to the Firm*, seguido de uma Avaliação Relativa usando múltiplos. Para a obtenção do preço-alvo das ações foram assumidos diversos pressupostos com base no desempenho recente da empresa e de projeções macroeconómicas.

Os resultados obtidos por ambos os modelos sugerem que as ações da Hilton, a 31 de dezembro de 2020, estavam abaixo do seu valor justo e, portanto, emitimos uma recomendação de COMPRA.

**Palavras-chave:** Hilton Worldwide Holdings; Indústria da Hospitalidade; Avaliação de Empresas; Fluxos de Caixa Descontados; Múltiplos

**Classificação JEL:** G30 (Corporate Finance and Governance: General); G32 (Corporate Finance and Governance: Value of Firms)

## **Abstract**

This master's project addresses the valuation of Hilton Worldwide Holdings, and its primary purpose is to set the target share price for the end of the year 2020. In addition, it aims to provide investors with an investment recommendation based on the difference between the actual close price and the target share price obtained during this valuation exercise.

Over the last century, with a worldwide presence, Hilton has become a highly recognized and respected name in the hospitality industry. In 2020 the company faced a massive challenge, initially due to the temporary suspension of most businesses with the several lockdowns, and then with the readaptation to what the future will entail. At this moment, Hilton is in charge of the difficult task of recovering in a world full of uncertainties.

To accomplish this valuation exercise we applied a model of the Discounted Cash Flow approach, the Free Cash Flow to the Firm, followed by a Relative Valuation using multiples. To obtain the target share price were assumed several assumptions based on the company's recent performance and macroeconomic projections.

The outputs provided across both models suggest that Hilton's shares, as of 31 December 2020, were under their fair value and therefore, we issued a BUY recommendation.

**Keywords:** Hilton Worldwide Holdings; Hospitality Industry; Company Valuation; Discounted Cash Flow; Multiples

**JEL Classification:** G30 (Corporate Finance and Governance: General); G32 (Corporate Finance and Governance: Value of Firms)

## Research Snapshot

| Company                        | Headquarters  | Industry    | Exchange | Ticker |
|--------------------------------|---------------|-------------|----------|--------|
| Hilton Worldwide Holdings Inc. | Virginia (US) | Hospitality | NYSE     | HLT    |

· In this master's project, we issue a **BUY** recommendation with a **target share price of \$124,64**, based on the DCF approach, which reflects an **upside potential of 12,03%**. The outcome of the Relative Valuation resulting from the average of the values obtained by P/E and EV/EBITDA multiples supports our conclusion.

· The COVID-19 pandemic crisis significantly affected the company's financial performance. All indicators ultimately reported values well below those of the preceding years. Nevertheless, Hilton continued to outperform many of its rivals concerning industry-specific financial measures. In the **Occupancy Rate (-46,76% 2020YoY)**, the **ADR (-21,24% 2020YoY)**, and the **RevPAR (-58,05% 2020YoY)**, the drops felt by Hilton are clear indicators of the impacts suffered by the company due to travel restrictions, the lockdowns, and other restrictive measures imposed by the governments, thus forcing the temporary shutdown of part of the hotels. Nevertheless, as stated above, despite these drops, the company continued to register higher values than its competitors. Therefore, the values recorded in 2020, despite being far lower than those previously registered, are also a clear sign regarding the competitiveness of the company that still positively stands out from the other companies.

· The hospitality industry is going through times of considerable instability and uncertainty, which enhances the risk of investing in companies like Hilton. However, despite all the assumptions made in this master's project, we conclude that our assessment of Hilton's fair value is not so far from the market's assessment. It is also relevant to mention that in this master's project, several projections were made regarding the company's future and that these projections are subject to various risks and uncertainties that could cause actual outcomes or results to differ materially from those obtained by us.

# Hilton

Table 1: Valuation Summary, Author's Analysis.

| Valuation Summary               |            |
|---------------------------------|------------|
| Close Price (31.12.2020)        | \$ 111,26  |
| Target Share Price (31.12.2020) | \$ 124,64  |
| Upside Potential (%)            | 12,03%     |
| <b>Recommendation</b>           | <b>BUY</b> |

Hilton Worldwide Holdings Inc. is a hospitality company. In 2020 the company accounted for 6 478 properties comprising 1 019 287 rooms in 119 countries. Being located worldwide, Hilton is committed to managing, franchising, owning, and leasing hotels and resorts. Moreover, the company is engaged in licensing its brands and intellectual property.

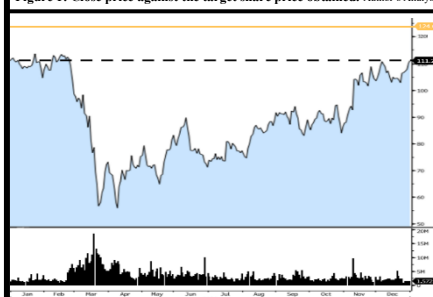
Table 2: Company Data, Bloomberg and Author's Analysis.

| Company Data                 | 2020        | 2021 (F) |
|------------------------------|-------------|----------|
| Market Cap (\$ Mn)           | \$ 30 885   |          |
| Number of Shares Outstanding | 277 590 904 |          |
| Dividends Paid (\$)          | \$ 0,15     |          |
| Dividend Yield (%)           | -           |          |
| Revenues (\$ Mn)             | \$ 4 307    | \$ 6 116 |

Table 3: Financial Indicators, Bloomberg and Author's Analysis.

| Financial Indicators    | 2020    |
|-------------------------|---------|
| <b>Profitability</b>    |         |
| EBITDA Margin (%)       | 0,98%   |
| Net Profit Margin (%)   | -16,60% |
| Operating Margin (%)    | -9,71%  |
| ROE (%)                 | -       |
| ROA (%)                 | -4,51%  |
| ROIC (%)                | -3,25%  |
| <b>Solvency</b>         |         |
| Debt-to-Equity          | -       |
| Debt-to-Capital         | 1.15x   |
| Debt-to-Assets          | 0.69x   |
| Interest Coverage Ratio | -0.97x  |
| <b>Liquidity</b>        |         |
| Current Ratio           | 1.73x   |
| Quick Ratio             | 1.64x   |
| Cash Ratio              | 1.32x   |

Figure 1: Close price against the target share price obtained. Author's Analysis.



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## **Glossary**

ADR – Average Daily Rate

APT - Arbitrage Pricing Theory

APV - Adjusted Present Value

ASC – Accounting Standard Codification

CAPEX - Capital Expenditures

CAPM - Capital Asset Pricing Model

CEO - Chief Executive Officer

CRP – Country Risk Premium

D – Market Value of Debt

DCF - Discounted Cash Flow

DDM - Dividend Discount Model

DJSI - Dow Jones Sustainability Indices

E – Market Value of Equity

EBIT – Earnings Before Interests and Taxes

EBITDA - Earnings Before Interests, Taxes, Depreciations, and Amortizations

EBT - Earnings Before Taxes

EPS – Earnings Per Share

EQV – Equity Value

ERMs – Excess Return Models

ESG - Environmental, Social, and Governance

EV - Enterprise Value

EVA - Economic Value Added

FCFE - Free Cash Flow to Equity

FCFF – Free Cash Flow to the Firm

FRED - Federal Reserve Economic Data

GAAP - Generally Accepted Accounting Principles

GDP - Gross Domestic Product

GICS - Global Industry Classification Standard

HGV – Hilton Grand Vacations

IC - Invested Capital

IMF - International Monetary Fund

IPO - Initial Public Offering

KPIs - Key Performance Indicators

LTM – Trailing Last Twelve Months

MRP - Market Risk Premium

MSc – Master of Science

MVA – Market Value Added

N.D. – No Date

NOA - Non-Operating Assets

NOPAT - Net Operating Profit After Taxes

NOPLAT - Net Operating Profit Less Adjusted Taxes

NTM – Next Twelve Months

NYSE - New York Stock Exchange

PHR - Park Hotels & Resorts

PP&E - Property, Plant, and Equipment

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RevPAR – Revenue Per Available Room

ROA - Return on Assets

ROE - Return on Equity

ROIC - Return on Invested Capital

S&P 500 - Standard & Poor's 500

SDGs - Sustainable Development Goals

SIC - Standard Industrial Classification

T&T - Travel & Tourism

TCJA - Tax Cuts and Jobs Act

TV - Terminal Value

U.S. – United States

USD – United States Dollar

WACC - Weighted Average Cost of Capital

WC - Working Capital

WTTC - World Travel & Tourism Council

YoY – Year over Year

## **Introduction**

The main goal of this master's project is to provide investors with a recommendation regarding the share price of Hilton Worldwide Holdings. To achieve this objective, we will determine the fair value of Hilton's shares as of 31 December 2020, and we will issue a target share price based on the outputs of the employed corporate valuation models.

Hilton's remarkable history begins in 1919, with Conrad Hilton purchasing his first hotel. Afterwards, Hilton led the industry with its innovation and provision of good quality of services. The company, which has always stood out for its forward-thinking, has been for several decades one of the leaders in the hospitality industry. Therefore, this master's project is an opportunity to study and analyse a century-old company that is a reference for the entire hospitality industry, while consolidating the knowledge acquired in the MSc in Finance at ISCTE-IUL.

The year 2020 was a real challenge to overcome for most companies. With the closure of the borders and several lockdowns, companies such as Hilton were the primary victims of mobility restrictions imposed on tourists. In this way, especially considering the recent events, the decision to analyse Hilton for the year 2020 was primarily motivated by the desire of learning more about how companies dealt with such an adverse environment.

This master's project begins with a literature review, in which several corporate valuation models are discussed. Then, the second part presents an analysis of Hilton, including the most remarkable historical events, the business model in place, and the recent financial performance. In addition, it includes the macroeconomic analysis of the industry in which Hilton operates. Finally, this master's project ends with Hilton's valuation. At this point, all the assumptions considered for the valuation exercise were established, along with the estimation process and the presentation of the results generated by the Discounted Cash Flow Valuation approach and the Relative Valuation approach. It is important to note that additionally, it was conducted a sensitivity analysis to the valuation outputs.

## **1. Literature Review**

As stated by Damodaran (2012), valuing a company allows us to define its true value. In line with this, it is crucial not to confuse the value of a company with its price (Fernández, 2007a). The great advantage of valuation is that it gives access to the company's value instead of the price, allowing investors and analysts to make intelligent decisions that lead to a more efficient market (Welch, 2009). So, we can consider valuation as the process of translating values into valuable information.

However, if price and value do not always represent the same, it is necessary to know how to distinguish them. Fernández (2007a) defines price as the quantity agreed between the seller and the buyer in the sale of companies. On the other hand, Biasio et al. (2011) describe value as a reflection of the company's utility for the appraiser. In this way, since the usefulness and preferences of human beings are not easily measurable, there is a degree of subjectivity in determining the company's true value.

Furthermore, there is still no such thing as a perfect standard process, i.e., a model that analysts can base themselves on that is entirely correct for any situation. Instead, what happens is that there are recommended models for each company, for example, according to its capital structure or life cycle (Talmor and Vasvari, 2011). Damodaran (2006) states that even though analysts use a broad spectrum of models with different assumptions, some of these models share common characteristics. Therefore, it becomes possible to group some of these models according to their approaches. As stated by Damodaran (2006), there are four distinct approaches: the Discounted Cash Flow Valuation, the Relative Valuation, the Contingent Claim Valuation, and the Asset-Based Valuation. However, there is no consensus on the existing approaches, and not all authors consider the existence of four of them. Even those who do, such as Fernández (2007a), separate the models differently. Even for Damodaran (2006), this is a debatable subject since he ends up considering a fourth approach that, in his opinion, is perfectly acceptable if not considered. Nevertheless, he ends up taking it into consideration due to its particularities.

The following sections will present only the Discounted Cash Flow Valuation approach and the Relative Valuation approach, with greater attention to the Free Cash Flow to the Firm model and the Multiples model, as they will be the ones to be used in the valuation of Hilton Worldwide Holdings. Whenever necessary, in both models, we will take a step forward and

analyse the fundamental adjustments to obtain the Equity Value and, consequently, the company's target share price.

### **1.1. DCF Valuation**

The contribution of the Discounted Cash Flow (DCF) approach to valuation is unquestionable. According to Damodaran (2012), those unable to understand the fundamentals of this valuation approach will never be able to explore and use other forms of valuation since it serves as the basis for the construction of the others. In essence, this approach considers the value of the company to be equal to the discounted expected cash flows that its business will generate in the future at a discount rate that reflects its riskiness (Luehrman, 1997b). In other words, it considers the value of a company right now as the present value of the future cash flows at a specific discount rate. In this way, this valuation approach is subject to the assumptions considered by the analyst, which will eventually influence and bias the result.

According to Damodaran (2012), we can split the DCF Valuation approach into two categories: the Enterprise Valuation models and the Equity Valuation models.

The Enterprise Valuation models, also known as the Firm Valuation models, are widely recommended because they value the company as a whole, i.e., they consider the value of the entire company structure. As stated by Damodaran (2012), these models consider the cash flows held by all the interested parties in the company, including not only the equity holders but the entirety of claim holders in the company, such as bondholders and preferred stockholders. Damodaran (2012) identifies three different models in this category: the Free Cash Flow to the Firm (FCFF), the Adjusted Present Value (APV), and the Excess Return Models (ERMs), with its main variant, called the Economic Value Added (EVA). On the other hand, the Equity Valuation models only value the company equity stake. These models focus their attention only on the value to the equity holders. Damodaran (2012) states that there may be considered two different models in this category: the Dividend Discount Model (DDM) and the Free Cash Flow to Equity (FCFE).

These two categories are used for different purposes once they generate different values. The Enterprise Valuation models are used to obtain the Enterprise Value, while the Equity Valuation models are used to yield the Equity Value directly. However, it is relevant to mention that the Enterprise Value can be used to calculate the Equity Value, or the opposite.

### 1.1.1. Enterprise Valuation Models

#### 1.1.1.1. Free Cash Flow to the Firm

Regarding DCF models, according to Luehrman (1997b), the most used is the Free Cash Flow to the Firm (FCFF) discounted at the Weighted Average Cost of Capital (WACC). The FCFF refers to an operating cash flow after accounting for depreciation and amortization expenses, taxes, working capital, and all the fixed asset investments. In other words, the FCFF represents the available cash flow for all capital providers, either bondholders or shareholders (Mota, 2020).

According to Damodaran (2006), the most applied formula to compute the FCFF is the following:

$$FCFF = EBIT \times (1 - t) + D\&A - CAPEX - \Delta WC \quad (1)$$

Where,

EBIT = Earnings Before Interest and Taxes

t = Corporate Tax Rate

EBIT x (1 – t) + D&A = Operating Cash Flow

D&A = Depreciation and Amortization

CAPEX = Capital Expenditures

Δ WC = Change in Working Capital

Regarding this formula, it is necessary to clarify some details. Firstly, it is relevant to mention that Depreciation and Amortization represent non-cash expenses. Even though they decrease the accounting income, they do not reduce the cash flows since there is no cash changing hands. So, they must be added back to calculate the free cash flow.

Conversely, we must consider the Capital Expenditures (CAPEX) and the change in Working Capital (Δ WC). The CAPEX refers to the long-term investments in fixed assets used in the business's operations. In this way, it represents an expense and decreases the FCFF. Since it does not appear in the Income Statement, we must consider it net of fixed asset disposals in the formula. The change in WC also represents a cash flow and negatively impacts the FCFF. Unlike the WC, which is a mere measure of liquidity representing the net amount of capital used in the company's daily operations, the change in WC indicates when money is being used

or released from the WC. For instance, if the difference between the WC of the current year and the previous year is positive, this implies that the company has more money tied up in operations, representing an outflow. On the other hand, whenever there is a decrease in WC, it means that less money has been used, representing an inflow. In this way, we conclude that it must be represented with a negative sign in the formula because it generates the opposite effect of its variation in the FCFF.

There are two additional aspects to consider in order to obtain the Enterprise Value (EV). Firstly, the reason for using the WACC as the discount rate in the FCFF. Bernström (2014) justifies the choice by stating that since the goal is to obtain the EV, defined as the firm value to all holders of capital, it is reasonable to use a discount rate that considers the entire capital structure of the firm. So, the WACC is the most recommended discount rate since it represents the firm average cost of capital from all sources, including both debt and equity.

The other point refers to the perpetual existence of the firm. Given the complexity of making forecasts, Damodaran (2012) argues that the time horizon should be divided into two periods to facilitate the process. Accordingly, we should consider a first period that should not exceed five years that corresponds to the company's path to reach a constant growth in perpetuity, and then consider the perpetuity period in which we should compute the Terminal Value (TV) to project the cash flows (Barroso et al., 2015).

Nonetheless, even considering a two-stage period, there is no reason to split this model into two different models to compute the EV. Instead, it is possible to use a general version of this model (Damodaran, 2012):

$$Enterprise\ Value = \sum_{t=1}^{t=n} \frac{FCFF_t}{(1 + WACC)^t} + \frac{TV_n}{(1 + WACC)^n} \quad (2)$$

With,

$$TV_n = \frac{FCFF_{n+1}}{WACC - g_T}$$

Where,

$FCFF_t$  = Free Cash Flow to the Firm in year t

$FCFF_{n+1} = FCFF_n \times (1 + g_T)$  = Free Cash Flow to the Firm at the end of the cruise year

$TV_n$  = Terminal Value at the end of the explicit forecast period

WACC = Weighted Average Cost of Capital

$g_T$  = Terminal Growth Rate

The EV is the present value of all future cash flows generated by the company over an infinite time horizon, considering the company's ongoing existence forever. To derive the Equity Value (EQV) from the EV is essential to recognize that this model focuses exclusively on assets related to the generation of operating cash flows for the company. Since to estimate the company's target share price we need to obtain the EQV of the company, i.e., the value of the company attributable to equity investors, we will have to consider assets that, despite not being required in the usual business operations, can generate value. These assets are called Non-Operating Assets (NOA) and represent, for instance, excess cash and marketable securities, real estate property not used in the operational activity, or non-controlling equity stakes. These assets can be distributed to shareholders directly or sold, increasing the value allocated to the company's shareholders without affecting expected future operating cash flows. Thus, they represent added value to the company's EQV and must be considered in the calculation (Goedhart et al., 2010).

In addition, the Non-Equity Claims must also be considered. Since we are now looking for the value attributable to the shareholders and not to all capital holders, we must subtract them. The Non-Equity Claims often refers to legal claims, other creditors, preferred stocks, contingent liabilities, financial debt, operating leases, minority interest, or provisions (Mota, 2020).

A relevant remark regarding these two items is that we should consider the market values instead of the book values. Nevertheless, since it is not easy to obtain such values, analysts often consider the book value as a proxy for the market value.

Now that we have enough tools to estimate the EQV, we can compute it as follows:

$$\text{Equity Value} = \text{Enterprise Value} + \text{NOA} - \text{Non-Equity Claims} \quad (3)$$

Where,

NOA = Non-Operating Assets

The final step in the valuation exercise is to calculate the value per share that, according to Henry et al. (2010), is obtained by dividing the EQV by the number of shares outstanding, as follows:

$$\text{Value per share} = \frac{\text{Equity Value}}{\text{Number of Shares Outstanding}} \quad (4)$$

In the following pages, we will go to analyse in detail the corporate tax rate, the specific computation of the WACC, and the TV, giving the notorious importance of all of them in the FCFF model.

#### **1.1.1.1.1. Corporate Tax Rate**

The choice of the corporate tax rate is a crucial decision in the valuation exercise, and there are two main ways to obtain it. On the one hand, we can consider the effective tax rate in the Financial Statement as our corporate tax rate. On the other hand, we can consider the marginal tax rate for the country where the company operates.

According to Damodaran (2012), if the purpose is to make projections is far safer to use the marginal tax rate. For Fernández (2004), the most reasonable option is using the effective tax rate as the corporate tax rate. It is possible to obtain the effective tax rate from the Financial Statement by dividing the taxes paid by the pre-tax income, i.e., the Earnings Before Taxes (EBT). However, Damodaran (2012) counters that choosing the effective tax rate is only valid if we consider some adjustments. In this way, even though it is acceptable to use the effective tax rate to arrive at the after-tax operating income in the early years, the tax rate used should converge to the marginal tax rate in the subsequent years. Thus, at least the tax rate used in perpetuity to calculate the TV must be the marginal tax rate (Damodaran, 2006).

When a company has multinational operations is difficult to calculate the marginal tax rate. It happens because different countries have different rates to tax their income. According to Damodaran (2006), we can proceed in several ways to overcome this situation. We can estimate the marginal tax rate by using a weighted average of the marginal tax rates with the weights based upon the company's revenue from the countries where it operates. Another possibility is applying a different marginal tax rate to each revenue stream according to its origin. However, the most used alternative is considering only the marginal tax rate of the country in which the company is incorporated. This last alternative assumes that the revenue generated in other countries will have to be repatriated, at some point, to the home country.

#### 1.1.1.1.2. Weighted Average Cost of Capital

According to Damodaran (2005), the WACC is the discount rate used in the valuation of the entire business since it reflects the cost of raising debt and equity to finance the company proportionately weighted according to their use. Therefore, the WACC expresses the return that both bondholders and shareholders demand to provide the company with capital.

The general formula can be presented as follows (Fernández, 2007b):

$$WACC = r_E \times \frac{E}{D + E} + r_D \times \frac{D}{D + E} \times (1 - t) \quad (5)$$

Where,

$r_E$  = Cost of Equity

$r_D$  = Cost of Debt

$E$  = Market Value of Equity

$D$  = Market Value of Debt

$t$  = Corporate Tax Rate

However, the WACC is also criticized for only being effective for a restricted group of companies. According to Ezzel and Miles (1980), the WACC is only suitable for companies with simple capital structures. Another aspect that generates disagreement is considering market values instead of book values when calculating the weights for equity and debt in the WACC computation. Damodaran (2012) argues that since the cost of capital measures the cost of issuing securities to finance projects and such securities are issued at the market value, we must consider the market value of equity and debt. The market value of equity ( $E$ ) is computed as follows:

$$E = \text{Company's current stock price} \times \text{Number of Shares Outstanding} \quad (6)$$

Regarding the market value of debt ( $D$ ), considering that debt is generally reported at the book value in the Financial Statements, this one is more complex to obtain. Since a significant part or even all the debt in most companies is not represented by tradable instruments, it becomes difficult for analysts to estimate its market value. Therefore, according to Mota (2020), the book value of debt is often considered a proxy of the market value since these two values tend to be very close in the majority of the cases. However, an alternative approach is considering all the debt in the Balance Sheet as a single coupon bond. Such a bond would have

a defined coupon equal to the interest expense on the total debt, with the book value being the face value of the bond and the weighted maturity of the debt corresponding to the bond maturity. So, discounting it back to the pre-tax cost of debt yields an approximate market value for the debt, as follows (Damodaran, 2006):

$$D = IE \times \left( \frac{1 - \frac{1}{(1 + r_D)^M}}{r_D} \right) + \frac{D_{BVM}}{(1 + r_D)^M} \quad (7)$$

Where,

IE = Interest Expenses

$r_D$  = Cost of Debt

M = Weighted Average Maturity of long-term Debt

$D_{BVM}$  = Book Value of Debt at maturity

To conclude the WACC estimation, we need to calculate the cost of equity ( $r_E$ ) and the cost of debt ( $r_D$ ).

#### 1.1.1.1.2.1. Cost of Equity

One of the main inputs necessary to calculate the WACC is the cost of equity, which represents the return that investors require to compensate them for the risk of investing their capital. However, its estimation is challenging as, unlike the interest rate on debt, the cost of equity is implicit and cannot be directly observed.

The most adopted solution to overcome this difficult task is to estimate the cost of equity by applying the Capital Asset Pricing Model (CAPM), as Damodaran (2012) refers. The CAPM defines the risk of a stock in terms of its sensitivity to the stock market. Alternatively, models such as the Arbitrage Pricing Theory (APT) and the Fama-French three-factor model can be applied. These models are considered multivariate extensions of the CAPM, which are not centred only on a single explanatory factor (Grabowski and Pratt, 2010).

The CAPM was developed by Sharpe (1964) and Lintner (1965), and it was constructed based on the model of portfolio choice of Markowitz (1959). Kaplan and Peterson (1998) state that the CAPM defines a linear relationship between the firm's cost of equity (expected return) and the slope coefficient (beta) in a regression of the firm's equity returns on a market index. According to Damodaran (2012), to apply the CAPM we must assume no transaction costs, no

taxes, no asymmetry of information (free access to all available information), and that the market is efficient. Within these assumptions, we can compute the CAPM as follows:

$$r_E = r_f + \beta_L \times (E(R_M) - r_f) = r_f + \beta_L \times MRP \quad (8)$$

Where,

$r_f$  = Risk-free Rate

$\beta_L$  = Levered Beta

$E(R_M)$  = Expected Return of the Market Portfolio

$MRP = E(R_M) - r_f$  = Market Risk Premium

#### **1.1.1.1.2.1. Risk-free rate**

An investment in a risk-free portfolio is one in which the investor knows that the expected return matches the actual return. According to Damodaran (2008a), the risk-free rate theoretically represents an investment with no risk. Such an investment must meet two requirements: there can be no default risk nor uncertainty about reinvestment rates. The first requirement implies that only the rate of securities issued by entities with no default risk can be considered to calculate the correct risk-free rate. Generally, this implies the use of securities issued by the governments. However, not all governments are default-free, and the presence of government or sovereign default risk can make it very difficult to estimate risk-free rates in some currencies. The second requirement implies that the risk-free security's maturity should, ideally, correspond to the investment horizon or the maturity of all discounted cash flows.

According to Borgersen and Kivedal (2018), one should consider a long-term government bond as the risk-free rate since it is the best proxy for risk-free investments. Theoretically, it should be a perpetual bond as companies will also be considered to have an infinite life. Despite that, Damodaran (2008a) recommends using a 10-year government bond since it is necessary to obtain other inputs and may be easier to find those inputs with a 10-year government bond than with a longest-term one.

Another point that Damodaran (2012) highlights is that the risk-free rate is determined by the currency in which the firm's cash flows are projected, not by the cash flows' origin. For instance, in the valuation of a worldwide company with expected cash flows projected in United States Dollar (USD), since it is the currency that prevails, the risk-free rate should be the 10-year United States (U.S.) government bond.

### 1.1.1.1.2.1.2. Beta

Generally, it is considered that a portfolio is exposed to systematic and unsystematic risks. The first one, also known as specific risk, corresponds to the company's risk component and may be mitigated by diversification. However, the second one, also known as market risk or non-diversifiable risk, represents the inherent risk of the market (Mullins, 1982). According to Damodaran (2011), this risk is measured by beta ( $\beta$ ), which establishes a relation between the risk of an asset and the market risk, and can be calculated as follows:

$$\beta = \frac{Cov_{R_x, R_m}}{\sigma_{R_m}^2} \quad (9)$$

Where,

$Cov_{R_x, R_m}$  = Covariance between the Asset x Return and the Market Portfolio Return

$\sigma_{R_m}^2$  = Variance of the Market Portfolio Return

Even though there are several approaches to obtaining the beta, Damodaran (2012) argues that the regression approach is probably the one that analysts generally prefer. By applying this approach, betas can be computed directly for listed companies through the public data from the price of their shares and a representative index of the whole market.

When we want to value a company that is not listed, the beta should be estimated from the unlevered beta of the industry, obtained from the weighted average of the levered betas from comparable listed companies, followed by an adjustment that allows the beta to reflect the company's leverage (Damodaran, 1999). This adjustment, commonly called the “Hamada” adjustment, implies that the beta of debt is equal to zero, i.e., the debt has no market risk and allows us to compute the levered beta ( $\beta_L$ ) of the firm as follows:

$$\beta_L = \beta_U^A (1 + (1 - t) \left( \frac{D}{E} \right)) \quad (10)$$

With,

$$\beta_U^A = \frac{\beta_L^A}{1 + (1 - t^A) \left( \frac{D}{E} \right)^A}$$

Where,

$\beta_U^A$  = Weighted Average of the Unlevered Beta across the Industry

$\beta_L^A$  = Weighted Average of the Levered Beta across the Industry

$t$  = Corporate Tax Rate

$t^A$  = Weighted Average of the Corporate Tax Rate across the Industry

$\frac{D}{E}$  = Debt-to-Equity Ratio

$(\frac{D}{E})^A$  = Weighted Average of the Debt-to-Equity Ratio across the Industry

If we are not comfortable considering that debt has no market risk, we can use the debt-adjusted approach instead of the conventional approach. This approach allows us to calculate the levered beta as follows:

$$\beta_L = \beta_U^A + (\beta_U^A - \beta_D)(1 - t) \left( \frac{D}{E} \right) \quad (11)$$

With,

$$\beta_D = \frac{r_D - r_f}{MRP}$$

$$\beta_U^A = \frac{\beta_L^A + \beta_D^A(1 - t^A) \left( \frac{D}{E} \right)^A}{1 + (1 - t^A) \left( \frac{D}{E} \right)^A}$$

$$\beta_D^A = \frac{r_D^A - r_f^A}{MRP^A}$$

Where,

$\beta_D$  = Beta of Debt

$\beta_D^A$  = Weighted Average of the Beta of Debt across the Industry

MRP = Market Risk Premium

$MRP^A$  = Weighted Average Market Risk Premium across the Industry

$r_D^A$  = Weighted Average Cost of Debt across the Industry

$r_f^A$  = Weighted Average Risk-free Rate across the Industry

#### 1.1.1.1.2.1.3. Market Risk Premium

The Market Risk Premium (MRP) represents the risk premium demanded by the investors due to investing in the market portfolio. As formula (8) demonstrates, the MRP corresponds to the difference between the Expected Return of the Market Portfolio ( $E(R_M)$ ) and the risk-free rate ( $r_f$ ).

In fact, the most common way of estimating the MRP is by accessing the historical market returns and subtracting the returns of some risk-free security (Damodaran, 2008b). However, there are several other approaches, such as elaborating surveys aimed at the primary users of this information that are directly involved in the risk premiums estimation (Barroso et al., 2015).

#### **1.1.1.1.2.1.4. Country Risk Premium**

In addition to the three components presented above, it is also usual to consider the Country Risk Premium (CRP) when estimating the cost of equity. The CRP represents the additional premium required to compensate investors for the risk of investing in riskier markets. Usually, when the investment is made in companies incorporated in AAA countries that operate only in their countries, such CRP should not be considered. However, for companies from countries like Portugal, where the country's risk of default is higher compared to AAA countries, we should consider the CRP. The simplest way to obtain the CRP is to consider it as the difference between the rates of government bonds of the company's home country and of a country with a credit risk AAA. Alternatively, Damodaran (2020) argues that the most effective way is considering the company's home country default spread as the CRP.

#### **1.1.1.1.2.2. Cost of Debt**

After analysing the cost of equity, we now turn to another key input for the WACC estimation, the cost of debt. This component corresponds to the cost of borrowing funds incurred by the company to finance its operations and it reflects the minimum required yield by lenders to compensate them for any loss of capital when lending to a borrower. However, since interest expenses are usually tax-deductible, we often consider the after-tax cost of debt instead of the pre-tax cost of debt to gauge its impact more accurately. This tax shield phenomenon represents the tax savings of a company due to the fact that interests can be considered as a business expense.

According to Damodaran (2012), the after-tax cost of debt is obtained as follows:

$$r_{D \text{ after-tax}} = r_{D \text{ pre-tax}} \times (1 - t) \quad (12)$$

Where,

$r_{D \text{ after-tax}}$  = After-tax Cost of Debt

$r_{D \text{ pre-tax}}$  = Pre-tax Cost of Debt

$t$  = Corporate Tax Rate

As we can see, the after-tax cost of debt depends on the corporate tax rate, already explained, and the pre-tax cost of debt. Regarding this last component, according to Damodaran (2008a), the pre-tax cost of debt is computed by adding a default spread to the risk-free rate using the following formula:

$$r_{D \text{ pre-tax}} = r_f + \text{Default Spread} \quad (13)$$

From the analysis of these two formulas, it remains only to understand how we can obtain the default spread. For companies with a rating notation, we can get the default component through the current company's credit rating and associated default spread (Damodaran, 2012). For companies without a rating notation, the recommendation to obtain the default spread is to estimate a synthetic rating. In this way, we should play the role of a rating agency and assign a rating to a firm based on its financial ratios. Another alternative is considering the most recent borrowings made by a firm to make an assessment of the default spreads charged to the firm (by comparing it with the risk-free rate) and use these spreads to estimate the cost of debt (Damodaran, 2006).

#### 1.1.1.1.3. Terminal Value

Every time we perform a valuation exercise, we spend most of the time analysing the explicit forecast period, which represents a short period compared to the number of years considered after the terminal year. According to Schill (2013), the TV represents the present value of all future cash flows of the firm beyond the terminal year. Thus, Holt et al. (1999) warn about the importance of the TV, as it influences the valuation of a company more than any other component.

Damodaran (2012) presents three alternatives to compute the TV: the Multiples approach, the Liquidation Value approach, and the Gordon Stable-Growth Model approach. The latter is undoubtedly the most widely used approach, and its general formula is as follows:

$$TV = \frac{\text{Cash Flow}_{n+1}}{r - g_T} = \frac{\text{Cash Flow}_n \times (1 + g_T)}{r - g_T} \quad (14)$$

Where,

$\text{Cash Flow}_{n+1} = \text{Cash Flow}_n \times (1 + g_T) = \text{Cash Flow at the end of the cruise year}$

$r = \text{Discount Rate}$

$g_T = \text{Terminal Growth Rate}$

To obtain an accurate TV, we should consider a level of CAPEX similar to the annual Depreciation and Amortization times one plus the terminal growth rate ( $g_T$ ) in the cash flow projection for the cruise year. A business with a level of CAPEX lesser than the Depreciation and Amortization in a couple of years is not a problem. However, the problem arises when this happens for many years, representing that the business is slowly liquidating itself. Therefore, from an investment perspective, we could not ensure that the company would sustain its growth perpetually.

Another aspect worth explaining is the aforementioned terminal growth rate. This growth rate represents the constant rate at which the expected free cash flows of the company are assumed to grow indefinitely, i.e., beyond the explicit forecast period. According to Damodaran (2012), the terminal growth rate cannot be greater than the economy's overall growth rate since no firm can grow forever at a rate higher than the growth rate of the economy in which it operates. Goedhart et al. (2010) go even further, considering that the best estimate is probably the expected growth rate of long-term consumption for industrial products, plus the inflation. In this way, since the Gross Domestic Product (GDP) is the best indicator of a nation's economic performance and considers several factors, such as consumption, the best proxy for the terminal growth rate is the expected real GDP growth rate plus the expected inflation.

#### **1.1.1.2. Adjusted Present Value**

According to Luehrman (1997a), the Adjusted Present Value (APV) model emerges as a viable alternative to the traditional DCF models and, despite not being widely used in practice, it results in more accurate valuations. The main criticism of the FCFF model is that it presents numerous shortcomings for companies with non-constant capital structures, for instance, the inaccuracy that the model generates by capturing the tax effects of having debt in the discount rate. In this context, Damodaran (2005) justifies that the APV is more accurate with non-constant capital structures since it separates all value components and analyses each one independently.

First introduced by Myers (1974), the APV defines the value of a levered firm as the value of an identical but unlevered, plus the value of any side effects due to leverage. These side effects often include the tax shield of debt and the expected bankruptcy costs. If, on the one hand, debt can have some positive effects as the tax shields, on the other hand, a higher level of debt will increase the default risk and, consequently, the expected bankruptcy costs. According to Damodaran (2012), the APV general formula is as follows:

$$Enterprise\ Value = Firm\ Value_{Unlevered} + PV_{tax\ shields} - PV_{E(BC)} \quad (15)$$

Where,

$PV_{tax\ shields}$  = Present Value of the Tax Shields

$PV_{E(BC)}$  = Present Value of the Expected Bankruptcy Costs

Therefore, this model introduced three components: the Unlevered Firm Value, the Present Value of the Tax Shields, and the Present Value of the Expected Bankruptcy costs.

The APV starts with the computation of the Unlevered Firm Value, which represents the company's value as if it had no debt. It is obtained by forecasting the FCFF and discounting it at the unlevered cost of equity with the following formula:

$$Unlevered\ Firm\ Value = \sum_{t=1}^{t=n} \frac{FCFF_t}{(1 + r_E^U)^t} + \frac{TV_n}{(1 + r_E^U)^n} \quad (16)$$

With,

$$TV_n = \frac{FCFF_{n+1}}{r_E^U - g_T}$$

Where,

$FCFF_t$  = Free Cash Flow to the Firm in year t

$FCFF_{n+1} = FCFF_n \times (1 + g_T)$  = Free Cash Flow to the Firm at the end of the cruise year

$TV_n$  = Terminal Value at the end of the explicit forecast period

$g_T$  = Terminal Growth Rate

$r_E^U = r_f + \beta_U \times (E(R_M) - r_f)$  = Unlevered Cost of Equity

The second step in this model is to compute the Present Value of the Tax Shields. As stated by Fernández (2011), this component defines the increase in the company's value when

considering more debt because of the tax benefits resulting from the payment of interests. Such happens since interest expenses are, as already mentioned, tax-deductible. Luehrman (1997a) argues that the tax shield must be discounted at the cost of debt because it has the same risk and uncertainty as debt, so the general formula is as follows:

$$PV_{tax\ shields} = \sum_{t=1}^{t=n} \frac{(IE \times t)_t}{(1 + r_D)^t} + \frac{TV_n}{(1 + r_D)^n} \quad (17)$$

With,

$$TV_n = \frac{(IE \times t)_{n+1}}{r_D - g_T}$$

Where,

IE = Interest Expenses

$(IE \times t)_{n+1} = (IE \times t)_n \times (1 + g_T) = (IE \times t)$  at the end of the cruise year

t = Corporate Tax Rate

TV<sub>n</sub> = Terminal Value at the end of the explicit forecast period

r<sub>D</sub> = Cost of Debt

g<sub>T</sub> = Terminal Growth Rate

Finally, we must compute the Present Value of the Expected Bankruptcy Costs. This last component reflects the effect of debt on the company's risk of default. According to Damodaran (2012), the Present Value of the Expected Bankruptcy Costs can be computed by the following formula:

$$PV_{E(BC)} = \pi_a \times PV_{Bankruptcy\ Costs} \quad (18)$$

Where,

π<sub>a</sub> = Probability of Bankruptcy

PV<sub>Bankruptcy Costs</sub> = Present Value of the Bankruptcy Costs

However, this is not an easy task as neither the probability of bankruptcy nor the bankruptcy costs can be directly estimated. To solve the first problem, Damodaran (2005) suggests using the company's bond rating at each debt level or statistical methods based on the firm's observable characteristics to estimate the probability of bankruptcy. In the case of the bankruptcy costs, the situation is even more complicated since there are direct and indirect

bankruptcy costs. The direct ones are associated with legal expenses and liquidation process costs resulting from selling the assets at a discount price. The indirect costs estimate is not straightforward since these costs represent lost sales, lost profits, and possibly the inability of the firm to obtain credit or issue securities except under especially terms. Even though the direct costs are easier to estimate, the situation gets harder for the indirect costs. Altman (1984) estimates that the direct costs range from 4,30% to 6,20% of the firm's market value, while the indirect costs represent about 17,30%.

### 1.1.1.3. Excess Return Models

#### 1.1.1.3.1. Economic Value Added

Even though there are numerous versions, the Economic Value Added (EVA) model emerges as the most used version of the Excess Return Models. In general, the EVA model allows estimating the EV as follows (Custódio and Mota, 2015):

$$\text{Enterprise Value} = \text{Invested Capital} + \text{Market Value Added} \quad (19)$$

Therefore, two concepts to estimate the EV were introduced: the Invested Capital and the Market Value Added. The Invested Capital (IC) can be seen from the asset perspective, as the investment needed for the company to conduct its business, or from the resource perspective, as the resources employed by the company to finance its business (Mota, 2020). These two perspectives can both be formulated as follows:

$$IC_{AV} = \text{Operating Assets}_{Non\ Current} + WC \quad (20)$$

Or

$$IC_{RV} = E_{BV} + D_{BV} - NOA \quad (21)$$

Where,

$IC_{AV}$  = Invested Capital from Asset Perspective

$IC_{RV}$  = Invested Capital from Resource Perspective

WC = Working Capital

$E_{BV}$  = Book Value of Equity

$D_{BV}$  = Book Value of Debt

NOA = Non-Operating Assets

Once obtained the IC, the next step is to compute the Market Value Added (MVA). According to Dierks and Patel (1997), the MVA indicates the company's ability to increase the shareholders' value over time. According to Custódio and Mota (2015), the MVA can be estimated as follows:

$$MVA = \sum_{t=1}^{t=n} \frac{EVA_t}{(1 + WACC)^t} + \frac{TV_n}{(1 + WACC)^n} \quad (22)$$

With,

$$TV_n = \frac{EVA_{n+1}}{WACC - g_T}$$

Where,

$TV_n$  = Terminal Value at the end of the explicit forecast period

$EVA_t$  = Economic Value Added in year t

$EVA_{n+1} = EVA_n \times (1 + g_T)$  = Economic Value Added at the end of the cruise year

WACC = Weighted Average Cost of Capital

$g_T$  = Terminal Growth Rate

As we can see, it is at this moment that we incorporate the value of EVA. According to Damodaran (2005), the EVA measures the surplus value created by an investment. In this way, EVA determines whether a company is creating or destroying value by subtracting a finance charge from the Net Operating Profit Less Adjusted Taxes (NOPLAT), as follows (Reddy et al., 2011):

$$EVA = NOPLAT - (WACC \times IC) \quad (23)$$

Where,

$NOPLAT = EBIT \times (1 - t)$  = Net Operating Profit Less Adjusted Taxes

WACC = Weighted Average Cost of Capital

$IC = IC_{AV} = IC_{RV}$  = Invested Capital

### 1.1.2. Equity Valuation Models

#### 1.1.2.1. Dividend Discount Model

According to Damodaran (2006), the Dividend Discount Model (DDM) represents the oldest DCF model, which considers the value per share as the present value of the perpetual stream of future dividends per share discounted at the cost of equity. Contrary to what was assumed previously, this model considers that the only cash flow that shareholders will receive is from the dividends (Fernández, 2004).

First presented by Williams (1938), the general formula of the DDM is as follows:

$$Value\ per\ share = \sum_{t=1}^{t=n} \frac{D_t}{(1 + r_E)^t} + \frac{TV_n}{(1 + r_E)^n} \quad (24)$$

With,

$$TV_n = \frac{D_{n+1}}{r_E - g_T}$$

Where,

$TV_n$  = Terminal Value at the end of the explicit forecast period

$D_t$  = Expected Dividends per share in the holding period  $t$

$D_{n+1} = D_n \times (1 + g_T)$  = Expected Dividends per share at the end of the cruise year

$r_E$  = Cost of Equity

$g_T$  = Terminal Growth Rate

Regarding the evolution pattern of the dividends, several versions were developed based on different insights about future growth. The first and simpler version of the DDM is the Gordon Growth Model, presented by Gordon and Shapiro (1956) and Gordon (1962). Henry et al. (2010) state that this version represents a Single-stage Growth Model since all future periods are gathered into one single stage, meaning that dividends grow forever at a constant rate. Its formula is as follows:

$$Value\ per\ share = \frac{D_0 \times (1 + g)}{r_E - g} \quad (25)$$

Where,

$D_0$  = Current Dividends per share

$r_E$  = Cost of Equity

$g$  = Dividends Perpetual Growth Rate

As stated by Henry et al. (2010), to overcome the assumption of a company growing at the same rate forever, Multi-stage Growth Models were developed. These models are more realistic since they consider different growth rates throughout the company's life. The most popular Multi-stage Growth Models are the H-Model and the Three-stage Growth Model.

The H-model, first presented by Fuller and Hsia (1984), is a Two-stage Growth Model based on the assumption that the initial growth phase linearly declines until it reaches a stable growth rate in a steady state. Unlike the classical Two-stage model, this model states that the growth rate's transition to the mature phase happens smoothly during the first stage. It also assumes that the dividend payout and the cost of equity are constant over time and can be estimated as follows:

$$Value\ per\ share = \frac{D_0 \times (1 + g_L)}{(r_E - g_L)} + \frac{D_0 \times H \times (g_S - g_L)}{(r_E - g_L)} \quad (26)$$

Where,

$D_0$  = Current Dividends per share

$r_E$  = Cost of Equity

$g_S$  = Initial short-term Dividend Growth Rate (in the first period)

$g_L$  = Normal long-term Dividend Growth Rate after year  $2H$  (in the last period)

$H$  = Half-life in years of the Extraordinary High-growth phase

Regarding the Three-stage Growth Model, there are two popular sub-versions that differ in how they interpret the second stage. In these models, the company is assumed to have three distinct stages of growth. The first stage represents the stage with the highest growth rate, while the third stage represents the stage with the lowest. However, in both the first and third stages, growth rates are assumed to be constant. In this way, several sub-versions emerge with the intent to produce more accurate results by considering different premises on how the transition from the first to the third stage occurs. In the first sub-version, it is assumed that the company has a second stage with a steady growth rate, similar to the other two stages. Thus, the constant growth rate must be lower than the one presented in the first stage. Conversely, it must be

higher than the one presented in the third stage. Such happens since it is considered that the company's life cycle moves towards the maturity stage, which represents the stage with the lowest growth rate. In the second sub-version, it is assumed that the second stage considers a marginal decrease in the growth rate until the company reaches the final stage instead of a constant growth rate. Compared to the first sub-version, this one became more used since it demonstrates great potential to provide more accurate results. This last sub-version treats the second and third stages as an H-Model, and it can be computed as follows (Henry et al., 2010):

$$Value\ per\ share = \sum_{t=1}^{t=n} \frac{D_0 \times (1 + g_s)^t}{(1 + r_E)^t} + \frac{TV_n}{(1 + r_E)^n} \quad (27)$$

With,

$$TV_n = \frac{D_0 \times (1 + g_L)}{(r_E - g_L)} + \frac{D_0 \times H \times (g_s - g_L)}{(r_E - g_L)}$$

Where,

$D_0$  = Current Dividends per share

$r_E$  = Cost of Equity

$TV_n$  = Terminal Value at the end of the explicit forecast period

$g_s$  = Initial short-term Dividend Growth Rate (in the first period)

$g_L$  = Normal long-term Dividend Growth Rate after year 2H (in the last period)

$H$  = Half-life in years of the Extraordinary High-growth phase

Whatever the versions of the model adopted, since the DDM is an Equity Value model, the ultimate goal is to compute the EQV. Therefore, it is just necessary to multiply the value per share estimated from any version of the DDM by the number of shares outstanding, as follows:

$$Equity\ Value = Value\ per\ share \times Number\ of\ Shares\ Outstanding \quad (28)$$

### 1.1.2.2. Free Cash Flow to Equity

An alternative to the DDM is the Free Cash Flow to Equity (FCFE) model, which also values just the equity stake in the business. According to Damodaran (2006), the FCFE model tries to grab what is missing in the DDM by discounting potential dividends rather than actual dividends.

Unlike the FCFF, the FCFE represents the amount available to distribute among just the shareholders, i.e., the amount that can be used to pay out dividends or stock buybacks. The general formula is as follows:

$$FCFE = Net\ Income + D\&A - CAPEX - \Delta\ WC + \Delta\ Debt \quad (29)$$

Where,

D&A = Depreciation and Amortization

CAPEX = Capital Expenditures

$\Delta\ WC$  = Change in Working Capital

$\Delta\ Debt$  = New Debt Issues – Principal Repayments

The FCFE calculation starts with net income, an accounting measure of shareholder income that already accounts for interest expense and tax savings from any outstanding debt (Damodaran, 2006). Then, like the FCFF calculation, we must add back the Depreciation and Amortization and subtract the CAPEX and the change in WC. Next, we must consider the effect of changes in debt levels since the cash flow available to shareholders is affected when debt is paid off or raised.

Once the FCFE is estimated, the next step is to discount it at the rate of return required by the firm's equity investors., i.e., the cost of equity (Damodaran, 2012). Then, similar to the FCFF model, it is reasonable to consider the NOA. However, once considered, we will have to proceed with the removal from the net income's computation of any revenue or cost associated with those NOA (Mota, 2020). In this way, we can estimate the EQV as follows:

$$Equity\ Value = \sum_{t=1}^{t=n} \frac{FCFE_t}{(1 + r_E)^t} + \frac{TV_n}{(1 + r_E)^n} + NOA \quad (30)$$

Where,

$FCFE_t$  = Free Cash Flow to Equity in year t

$TV_n$  = Terminal Value at the end of the explicit forecast period

$FCFE_{n+1} = FCFE_n \times (1 + g_T)$  = Free Cash Flow to Equity at the end of the cruise year

$r_E$  = Cost of Equity

NOA = Non-Operating Assets

$g_T$  = Terminal Growth Rate

## 1.2. Relative Valuation

As stated previously, the DCF Valuation approach has become quite popular. However, the complexity of its use enhances the use of alternative approaches. In this chapter, we will look at the Relative Valuation approach, also known as the Multiples model.

According to Damodaran (2012), the goal of the DCF Valuation approach is to determine the asset's value based on its cash flow, growth, and risk profile. In Relative Valuation, the goal is to value assets based on the value that the market is willing to pay for similar assets, using financial ratios called multiples (Krishnamurti and Vishwanath, 2009).

Despite the clear advantages of this approach, namely its simplicity, it also suffers from how easy is to manipulate its outcome. Subjectivity begins at the very moment of the peer's group definition, i.e., the moment of setting a comparable group of firms that present similar financial features and are submitted to the same macroeconomic events as the company in analysis (Foushee et al., 2012). So, there is no well-defined rule on which companies can or cannot be considered comparable, always remaining for the analyst the task of trying to define a set of criteria to identify the peer group. Then, it must be decided which multiples to consider in the valuation. These multiples refer to a class of different financial ratios used to value a stock. So, there is again a range of opportunities for possible manipulation and bias of the result. As Damodaran (2012) states, it is not uncommon to see analysts adopting a cynical view, selecting a multiple that reflects their purposes, i.e., that best fits their story. However, the most usual procedure is selecting multiples typically considered for specific sectors. In addition, it is also important to mention that there is the possibility of estimating multiples based on the company's historical performance or from a looking-forward perspective. In other words, the analyst must choose whether to use multiples based on the company's past performance or based on projections for the company's future performance. However, regarding this aspect Damodaran (2012) has no doubts that multiples based on a forward-looking basis provide better information about the current market valuation of a stock or business. Even so, since it is not easy to make (or have available) such projections, it is recommended to use the most recent historical data available. Besides all these aspects, the Relative Valuation approach still depends on which rules the analyst considers to be the fairest in identifying outliers. Thus, despite being a valid approach, Relative Valuation tends to be used as a complementary valuation approach due to the lack of transparency and objectivity regarding the underlying assumptions, making it particularly vulnerable to errors or manipulation (Fernández, 2001).

Once all these steps are completed, the next ones are to compute the average of the adjusted individual multiples of the companies that were selected for the peer group and subsequently multiply it by the denominator of the corresponding multiple of the firm in analysis to obtain the EQV. Depending on the multiple chosen, and because we need to obtain the EQV to estimate the company's target share price, it may be necessary to make adjustments whenever the EQV is not directly obtained.

Next, in addition to the most used multiples, the necessary adjustments for the multiples applied in this master's project are presented, as well as a more detailed analysis of the outlier identification process since it represents a critical step in the valuation exercise.

### 1.2.1. Multiples

In the table below, we present the most used multiples according to the categories defined by Fernández (2001): the Equity Value Multiples, the Enterprise Value Multiples, and the Growth-referenced Multiples. Although all the categories gather multiples with a lot of practical utility, we will focus only on the first two categories. The last one is left out since it gathers multiples intended mainly for growth industries such as health, technology, and telecommunications.

**Table 4: Multiples by Categories.** Fernández (2001).

|                             |                                    |                  |
|-----------------------------|------------------------------------|------------------|
| Equity Value Multiples      | <b>Price to Earnings Ratio</b>     | <b>P/E</b>       |
|                             | Price to Sales                     | P/S              |
|                             | Price to Book Value                | P/BV             |
| Enterprise Value Multiples  | <b>Enterprise Value to EBITDA</b>  | <b>EV/EBITDA</b> |
|                             | Enterprise Value to Sales          | EV/Sales         |
|                             | Enterprise Value to Free Cash Flow | EV/FCFF          |
| Growth-referenced Multiples | Price to Earnings Growth           | PEG              |
|                             | Enterprise Value to EBITDA Growth  | EV/EG            |

In terms of our valuation exercise, we decided to select the P/E multiple from the Equity Value Multiples category and the EV/EBITDA multiple from the Enterprise Value Multiples category. Later in Chapter 3, we will address in more detail the reasons that motivated our choice. Right now, it is only relevant to understand what each one represents.

According to Damodaran (2006), the P/E multiple works as a proxy for several crucial characteristics of the companies. In this way, the P/E may be helpful to attest to the associated risk of stock growth for companies with similar market exposure and projected growth rates. However, this multiple is the target of criticism, namely its vulnerability to changes in capital structures, being susceptible to manipulation by managers that pursue advantage (Goedhart et

al., 2010). Even so, according to Damodaran (2012), it represents and will continue to represent one of the most widely used multiples as it can be easily obtained, as demonstrated in the formula below:

$$P/E = \frac{\text{Market Capitalization}}{\text{Total Net Income}} = \frac{\text{Market value per share}}{\text{Earnings per share}} \quad (31)$$

Regarding the EV/EBITDA multiple, this is seen as the best alternative to the P/E multiple as it is neutral to the company capital structure, allowing comparisons between companies with different degrees of financial leverage without obtaining biased results. In this way, it enables us to derive the value of the entire company in analysis by resorting to a variable that represents the baseline profitability of the company and concerns to all claimants, as follows:

$$EV/EBITDA = \frac{\text{Enterprise Value}}{EBITDA} \quad (32)$$

As explained previously, since our objective is to obtain the company's target share price, we must still consider adjustments whenever a multiple does not provide us with the EQV. While the Equity Value Multiples do not require further adjustments, the Enterprise Value Multiples do because when we multiply the adjusted average by the denominator referent to the considered multiple, the result obtained is the EV, not the EQV. Consequently, we will have to replicate for multiples like the EV/EBITDA the same adjustments considered for the FCFF model to obtain the EQV and then the value per share.

### 1.2.2. Peer Group

Even with every precaution to homogenize the peer group, anomalous values are likely to be identified during the Relative Valuation process. For this reason, as Barroso et al. (2015) point out, guidelines for identifying and, as a result, deleting outliers must be defined. Since these guidelines will impact the results, to avoid additional manipulation from the analyst, they must be defined a priori.

In an attempt to standardize the process of defining such guidelines, Barroso et al. (2015) suggest considering an observation that deviates from the mean or median by  $\pm$  one standard deviation as an outlier. Once found the outliers, an acceptable procedure is to remove them and recalculate the mean or median of the multiple without them. A radical alternative is to remove not only the outliers but the company that recorded such outliers too, and even the multiple itself if it records several outliers (Barroso et al., 2015).

## **2. Company and Industry Overview**

### **2.1. Hilton Worldwide Holdings**

#### **2.1.1. History and General Description**

Hilton was born in 1919 when Conrad Hilton bought his first hotel named The Mobley in Cisco, Texas. In 1925, a few years after entering the hotel business, Conrad built the first hotel to carry Hilton's name, the Dallas Hilton. From that moment on, a process of expansion has begun. In 1943, Hilton became the first coast-to-coast chain of hotels in the U.S. due to the purchase of the emblematic Roosevelt and Plaza hotels in New York. In 1946, Hilton Hotels Corporation is created, becoming the first hotel company post-World War II to sell a stock on the New York Stock Exchange (NYSE).

Between the 50s and the 60s, Hilton expanded so much its portfolio that it suffered a spin-off. In this way, Hilton International was born to manage international hotels, whilst the mission of the Hilton Hotels Corporation was to manage only properties on American soil. In 1967, Hilton International was sold to Trans World Airlines, which pursued synergies between the hotel market and air transport.

In 1979, Conrad Hilton dies, which motivated a process of restructuring and modernization in the company. A few years after entering the domestic gaming business, the company creates a website and implements the Hilton Honors, the guests' loyalty program. In 1992, the joint venture between Hilton Hotels Corporation and Grand Vacations set Hilton's entry into the vacation ownership market by the name of Hilton Grand Vacations. A few years after that, Hilton spin-off gaming operations into a separate publicly held company called Park Place Entertainment (later Caesars Entertainment). In 2006, Hilton Hotels Corporation reacquires its sister Hilton International, gathering both companies for the first time in 40 years, which resulted in a considerable expansion of Hilton's portfolio of brands.

In 2007, after the merger agreement with affiliates of The Blackstone Group, the Hilton Hotels Corporation privatization process got completed. Two years later, Hilton Worldwide Holdings was born, and Christopher J. Nassetta became president and Chief Executive Officer (CEO) of the company. In 2013, after Blackstone refinanced about \$13 000 Mn of the hotel chain's debt, Hilton returned to the NYSE (Oran, 2013). In 2017, the spin-offs of Park Hotels & Resorts (PHR) and Hilton Grand Vacations (HGV) got completed after Hilton announced its intention to spin-off its timeshare and real estate businesses.

As of 31 December 2020, Hilton has its headquarters in Tysons Corner, Virginia and is listed on the NYSE under the ticket HLT, having a market cap of \$30 885 Mn with 277 590 904 shares outstanding. The company accounts for 6 478 properties comprising 1 019 287 rooms in 119 countries and territories. Additionally, the company has 2 570 hotels in its development pipeline, representing over 397 000 rooms under construction or approved for development throughout 116 countries and territories. Despite its strong presence worldwide, Hilton's performance in 2020 suffered a severe impact as COVID-19 forced a reduction in travel, resulting in the complete and partial suspensions of hotel operations in many of the areas where Hilton hotels are situated.

### 2.1.2. Brand Portfolio and Business Model

With over 100 years of service, Hilton is one of the largest hospitality companies in the world. As of 31 December 2020, the portfolio of Hilton consists of 18 brands, distributed into six chain scales: Luxury, Upper Upscale, Upscale, Upper Midscale, Midscale, and Timeshare. All these brands are grouped according to the STR chain scale, except the last one, which represents the license agreement with HGV. Hilton continues earning a fee from a long-term license agreement with HGV, which allows the access to Hilton's commercial services and brands, despite HGV being an independent public traded company. Besides the 18 existing brands, Hilton also has the Hilton Honors brand, the guests' loyalty program, which as of 31 December 2020, accounts for more than 120 million members.

Figure 2: Hilton's brands portfolio. Hilton 2020 annual report.

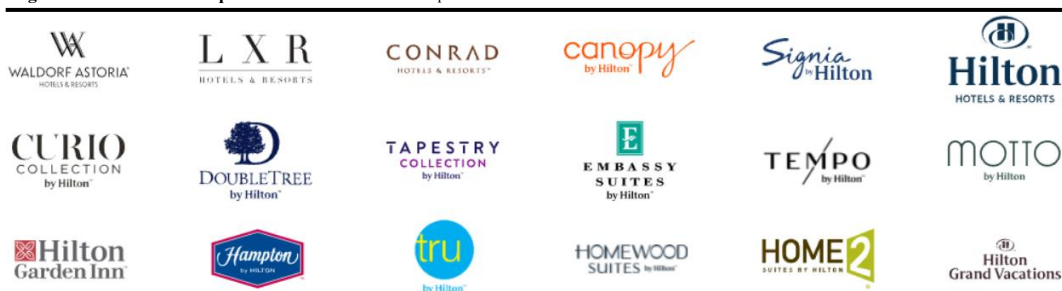
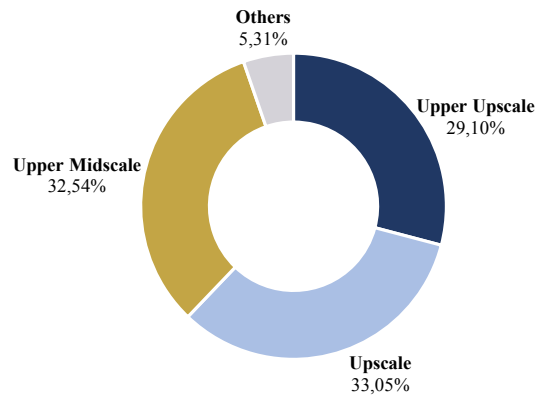


Figure 3 shows that most of Hilton's rooms belong to the Upper Midscale and Upscale categories, representing 65,59% of all rooms, corresponding to 668 571 rooms. Then, comes the Upper Upscale category with 296 590 rooms, totalling 29,10% of all rooms. Finally, with the lowest percentage of all rooms is the Others category, which includes Luxury, Midscale, Timeshare categories rooms and a set of rooms not specified in the Hilton 2020 annual report. This latter category comprises only 5,31% of all rooms, equivalent to 54 126 rooms. In this way, we conclude that most of the rooms offered by Hilton belong to an upper-middle segment, which evidences the pursuit of Hilton to deliver outstanding customer experiences and superior operational performance.

**Figure 3: Rooms by Category.** Hilton 2020 annual report.



Regarding the business model in place, Hilton operates its business through a Management and Franchise segment and an Ownership segment. Prior to the 2017 spin-offs, the PHR and HGV results were reported under the Ownership and Timeshare segments, respectively. Following the 2017 spin-offs, Hilton no longer reported the Timeshare segment because it ceased the isolated timeshare operations despite continuing to receive the previously mentioned fee. Alternatively, Hilton started including the timeshare properties in the Management and Franchise segment. Accordingly, this segment refers to all the hotels of third-party owners, including all the franchised hotels that license Hilton brands and the timeshare properties. The Management and Franchise segment generates revenue mainly from fees charged to hotel owners under management and franchise contracts. As of 31 December 2020, this segment included 715 managed hotels and 5 702 franchised hotels, including timeshare properties, consisting of 999 887 rooms.

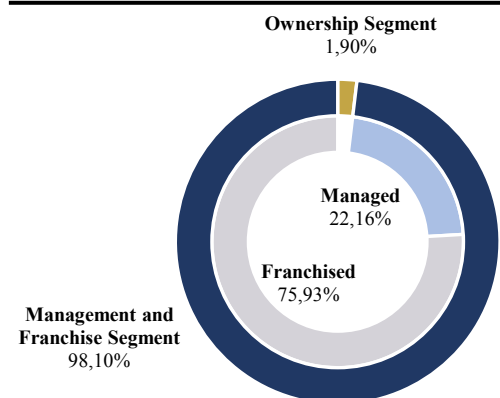
When it comes to business management contracts, these are usually set to last 20-30 years (plus 5-year or 10-year extension options) and include early termination rights. Hilton receives from management contracts: a base management fee (a percentage of the monthly gross revenue of the hotel) and, when applicable, an incentive management fee (a percentage of the operating profits of the hotel). On the other hand, the franchise contracts are usually set to last approximately 20 years for new hotels and 10-20 years for the existing ones. These contracts include 10-year or 15-year extension options and, similar to the management contracts, the early termination rights. Under the franchising contracts, each franchisee pays

an application fee and a royalty fee (a percentage of the monthly gross room revenue of the hotel). Additionally, regardless of the type of contract, the owners/franchisees generally pay a monthly program fee based on the underlying hotel's sales and usage as reimbursements for advertising costs, participation in the Hilton Honors guests' loyalty program, training, computer systems, and quality assurance programs.

The Ownership segment includes owned, leased, and joint venture hotels. This segment primarily derives earnings from providing hotel rooms per night, food, and beverage. As of 31 December 2020, the ownership segment included 61 hotels totalling 19 400 rooms, comprising 53 hotels that Hilton wholly owned or leased, 1 hotel owned by a consolidated non-wholly owned entity, 2 hotels leased by a consolidated variable interest entity and 5 hotels owned or leased by unconsolidated affiliates.

As we can see in figure 4<sup>1</sup>, the Management and Franchise Segment is the one that most represents Hilton's business, with 98,10% of the entire portfolio by rooms, where 75,93% of the segment is exclusively from franchising contracts with 773 982 rooms against 22,16% from management contracts with 225 905 rooms. On the other hand, the Ownership segment represents only 1,90% of total rooms, equivalent to 19 400 rooms.

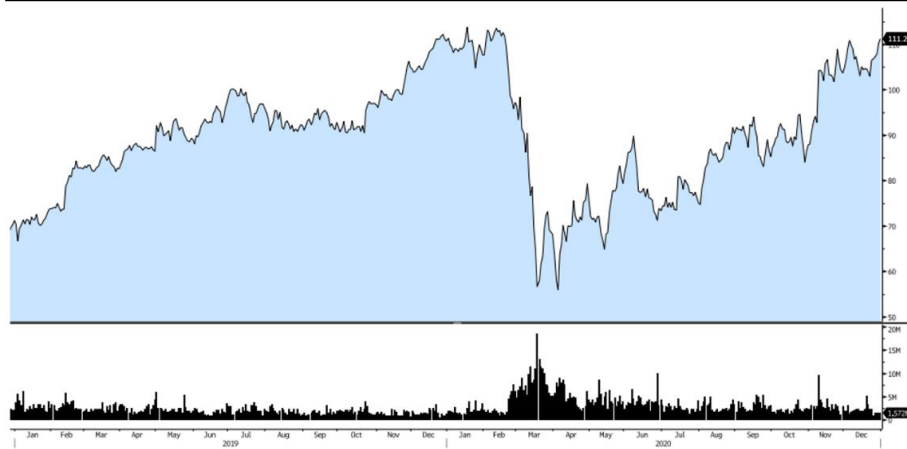
Figure 4: Rooms by Segment. Hilton 2020 annual report.



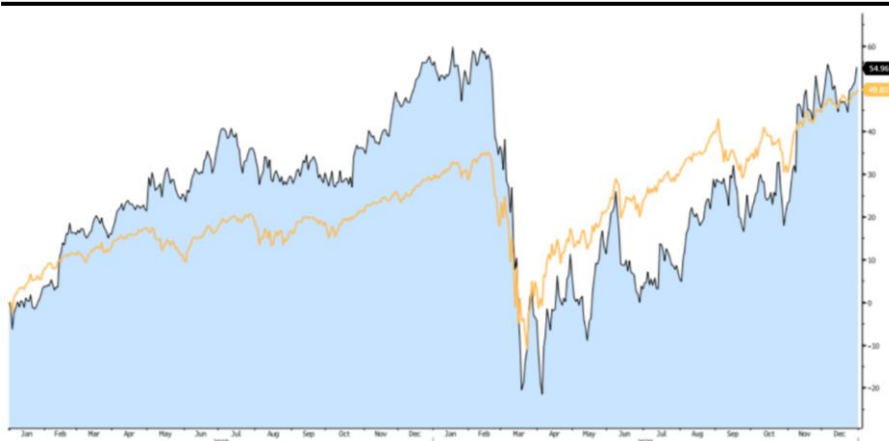
### 2.1.3. Share performance, Shareholder Structure, and Dividend Policy

As of 13 December 2013, with the Initial Public Offering (IPO), Hilton returned to the NYSE with its shares valued at \$20,00. Hilton raised over \$2 300 Mn, representing the biggest-ever hotel IPO until that moment. Figure 5 shows the Hilton share price evolution registered before and during the period of the pandemic crisis. At the end of 2018, the share price was \$71,80, and thenceforward the price has only increased. However, in the first quarter of 2020, the Hilton share price dropped sharply due to the onset of the pandemic crisis. Around this time, there was the highest trading volume recorded so far. As confidence in the financial markets grew, the share price of Hilton recovered remarkably. Before the end of 2020, the company saw its shares reaching prices above \$100,00, ending the year at \$111,26.

<sup>1</sup> Due to the approximations, the sum of the Management and Franchise sub-segments equals 98,10%.

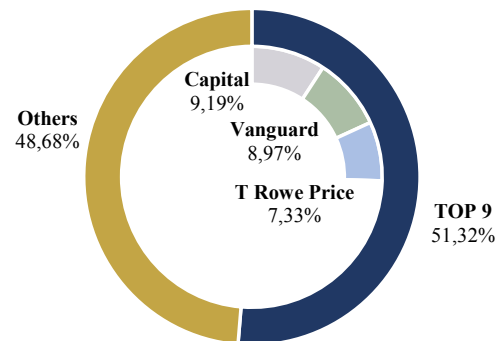
**Figure 5: Hilton share price trend and trade volume between 2018-2020.** Bloomberg and Author's Analysis.

As we can see in Figure 6, by comparing the Hilton share performance with the Standard & Poor's 500 (S&P 500) Index since the end of 2018, we conclude that during the pre-pandemic period the shares of Hilton appreciated above the S&P 500 Index. However, with uncertainty hanging in the financial markets in March due to the onset of the pandemic crisis, Hilton's shares ended up suffering a devaluation greater than the S&P 500 Index. In the following months, the trend remained the same, i.e., the pace at which the S&P 500 Index recovered was higher than that of Hilton's shares. In fact, what was truly surprising was the pace at which the S&P 500 Index recovered. According to Detrick (2021), the chief market strategist at LPL Financial, this recovery represented one of the most incredible bull markets ever seen. This trend was only reversed in November 2020, with Hilton recording a higher appreciation than the S&P 500 Index. Normalized as of 31 December 2018 prices, we can see that the share price of Hilton between 2018-2020 appreciated by 54,96%. By contrast, the appreciation of the S&P 500 Index was slightly lower, at 49,83%.

**Figure 6: Hilton share performance against S&P 500 between 2018-2020.** Bloomberg and Author's Analysis.

As of 31 December 2020, Hilton had only common stock having no preferred stock. At that time, the number of shares outstanding was 277 590 904. Figure 7 shows that 9 shareholders owned more than 50,00% of Hilton. Of this restricted group of shareholders, the Capital Group Companies stood out with 25 522 252 shares, representing a company stake of 9,19%. The Vanguard Group and the T Rowe Price Group completed the podium, with 8,97% and 7,33% of the company stake, respectively.

Figure 7: Hilton's shareholder structure. Bloomberg.



As a result of the COVID-19 pandemic, Hilton suspended the payment of dividends. Usually, such dividends were paid quarterly and on an undefined basis. However, in March 2020, the company suspended the declaration and payment of dividends as part of proactive measures to secure its liquidity position in response to the pandemic. So far, there is no decision regarding the resumption of dividend payments, which will depend, among other things, on the results of operations, cash needs, financial condition, contractual restrictions, and other factors that the board of directors may consider relevant.

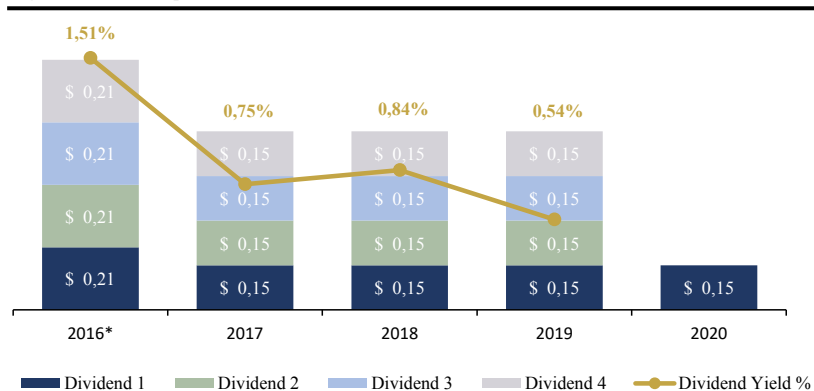
Figure 8 shows that during 2020 were paid only the dividends for the first quarter, equivalent to \$0,15. Therefore, the dividend yield analysis refers only to the period between 2016-2019. Since the payments of dividends were suspended in 2020, and we are only considering yearly values, comparing 2020 with any other year would be unfair. In addition, we are also considering an adjustment for 2016. This adjustment comes from a 1-for-3 reverse stock split of Hilton's outstanding common stock, completed in January 2017. Usually, companies perform a reverse stock split to boost their stock price by decreasing the number of shares outstanding. However, if this strategy is not followed by significant changes that improve operations, projected earnings, and other important information to investors, the result may not be as good as expected. Even so, Hilton saw its shares priced at \$55,81 in 2016 actually rise to \$79,86 in 2017.

Since each stock yielded \$0,84 in 2016, the current value would now be three times higher. In other words, each holder of one Hilton's share (the equivalent of 3 before this reverse stock split) had seen \$2,52 generated during 2016. Since this analysis is based on the dividend yield, which reflects how much a company pays out in dividends each year relative to its stock price, if we do not consider an adjustment, the dividend yield in 2016 would be deceptively high.

Such would happen just because we would be considering the three old stocks that yielded each one a dividend amount in the past, as only one stock now that generates such a total amount. Therefore, to obtain values that actually reflect what has happened during the last few years, we considered the dividends generated by an old stock in 2016 so that the impact of the reverse stock split does not bias the results.

In this way, we conclude that the dividend yield has varied very much, not following a specific trend. Even considering the adjusted dividends, 2016 registered the highest dividend yield compared to recent years. Since the dividends paid by Hilton between 2017-2019 remained unchanged, dividend yield varied due to a variation in the share price. If we had no other information, just by analysing the dividend yield for the period between those three years, we could conclude that Hilton's share price had decreased in 2018 and increased during 2019. In fact, it represents exactly what happened as Hilton's share price varied by -10,01% and +54,47% between 2017-2018 and 2018-2019, respectively.

Figure 8: Dividends paid and Dividend Yield %. Bloomberg.



#### 2.1.4. Environmental, Social, and Corporate Governance

In 2020, a year after being appointed for the first-time global industry leader in the Dow Jones Sustainability Indices (DJSI), Hilton repeated the feat. Hilton thus consolidated its leadership position across economic, social, and environmental pillars. As one of the largest hotel companies in the world, Hilton recognizes that it is responsible for protecting the communities and the planet. Despite the challenges of the COVID-19 pandemic, Hilton remained committed to driving responsible travel and tourism globally. The company believes that as the world recovers from this crisis, the urgency for corporate responsibility leadership is greater than ever.

The terms Environmental, Social, and Governance (ESG) refer to business and investment sustainability. Even though its metrics are not currently a required part of financial reports for publicly traded companies, a growing number of companies are beginning to include them in their reported Financial Statements or in a separate document, which is the case of Hilton. The 2020 ESG report released by Hilton presents the ESG performance indicators of the company. In addition, the report also includes the primary goals defined by the company for 2030 in line with the global Sustainable Development Goals (SDGs) adopted by the United Nations in 2015.

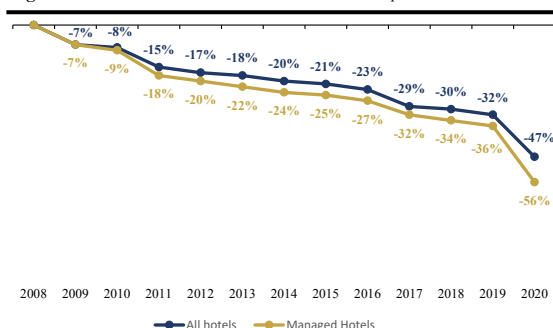
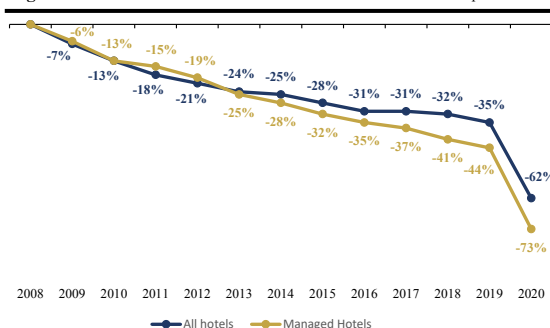
According to Christopher J. Nassetta, Hilton was founded on the premise that travel can make the world a better place (Hilton, 2019). In this way, the company is committed to increasing the investment with the social impact and substantially reducing its environmental footprint. To be able to do that, in 2018, Hilton launched the Travel with Purpose 2030 Goals, aimed to generate a positive impact on the world's future.

Next, we will go into further detail about some of these goals, as well as Hilton's performance so far towards their fulfilment.

#### **2.1.4.1. Environmental Impact**

Hilton operates in some of the most beautiful places in the world and therefore recognizes that it must be an active part of its preservation. Relatively to the Environmental impact, one of the objectives concerns carbon emissions. As stated in the ESG report, Hilton is committed to leading the hospitality industry towards a zero-carbon economy and reducing its greenhouse gas emissions by 61,00% until 2030. Figure 9 shows that the company has continuously reduced its carbon emissions in the last years. However, Hilton recognizes that the recent abrupt reduction is neither representative nor sustainable since it is a consequence of the occupancy reduction and complete or partial suspensions of properties.

Another goal is to reduce waste by 50,00% until 2030. The strategy seeks to decrease the overall amount of waste produced in the hotels by 50,00% while also taking steps to divert the remaining waste from landfills through donation, recycling, composting, energy from waste incineration, and other opportunities. As we can see in Figure 10, we noticed that between 2016-2019 the trend of decreasing waste has almost stabilized. This situation is of great concern to Hilton's managers as it demonstrates the inability to control waste as the company grows. In 2020, the waste dropped sharply again just due to occupancy reduction.

**Figure 9: Carbon reduction %, Hilton 2020 ESG report.****Figure 10: Landfilled waste reduction %, Hilton 2020 ESG report.**

### 2.1.4.2. Social Impact

In more than 100 years of Hilton history, there has never been an event more devastating to the hospitality industry than the COVID-19 crisis. This unprecedented year has given new urgency to supporting local communities, aiding team members, and promoting a culture of fairness.

Aiming to double its social impact investment until 2030, Hilton sought to use its global scale as a driver of opportunities, focusing on positively impacting human rights and strengthening communities. Hilton employees from 82 countries have been involved in various volunteer campaigns to help and respond to the urgent needs of local communities.

In addition, Hilton created the Hilton Workforce Resource Center in 2020, a personalized website aimed to connect Hilton's team members to temporary and permanent job opportunities in organizations facing COVID-19 hiring outbreaks. Over 150 firms posted around a million jobs, which proved the success of this initiative.

### 2.1.4.3. Corporate Governance

Hilton believes that its robust corporate governance structure is the key to ensuring the success and longevity of the business. Within the board of directors, Hilton has three specialized committees that assist the board in fulfilling its duties: the Audit Committee, the Compensation Committee, and the Nominating & ESG Committee.

Hilton is proud that 8 of 10 directors that compose the board are independent, with only 1 executive member, the CEO Christopher J. Nassetta. In terms of the committees, they are entirely composed of independent directors.

As a result of the pursuit to maintain the highest ethical standards in the hospitality business, acting with integrity, and conducting the business in compliance with the law, in 2020

and for the third consecutive year, Hilton was appointed as one of the most ethical companies in the world by Ethisphere.

### **2.1.5. Financial Analysis**

For this analysis, we exclusively considered the period between 2016-2020. It is also crucial to mention that this analysis and the exercise valuation were performed according to Hilton's Financial Statements taken from Bloomberg (the Income Statement, the Balance Sheet, and the Cash Flow Statement) and not from Hilton 2020 annual report. Companies can report values differently, using different criteria. Consequently, the same data may look slightly different across various filings, making comparisons difficult. Since we need to compare data from several companies, we chose to use the Financial Statements that Bloomberg provides. The Income Statement considered is according to the Generally Accepted Accounting Principles (GAAP). Regarding the Balance Sheet and the Cash Flow Statement, we also considered those harmonized by Bloomberg, which standardizes the datasets using industry and market practices so that users can easily compare companies in the same industry (Annex A, B, and C).

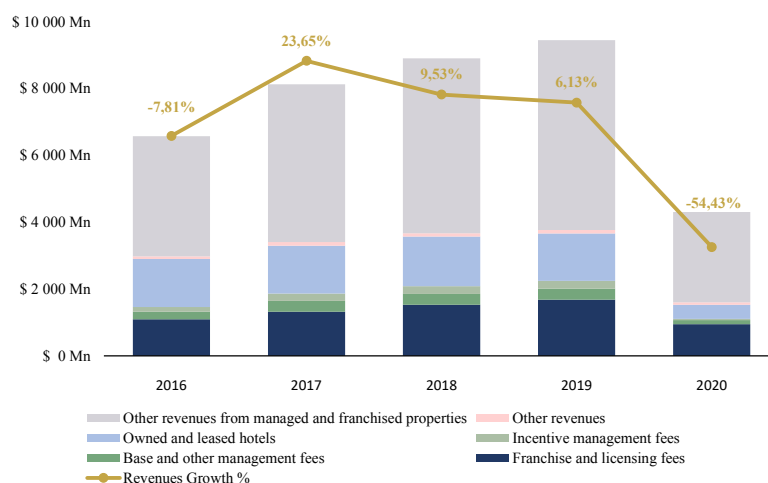
#### **2.1.5.1. Profitability**

As we can see in Figure 11, in 2020, the total revenues of Hilton were \$4 307 Mn, representing an abrupt decrease of 54,43% compared to 2019. During the last five years, the primary revenue sources have been the franchise and licensing fees, the owned and leased hotels, and the other revenues from managed and franchised properties. These three sources, which annually generate an average of 90,00% of total revenues, in 2020 ended up recording a combined decrease of 53,66%, equivalent to \$4 716 Mn.

Of the three, the one that experienced the biggest decrease, in relative terms, was the owned and leased hotels component, registering -70,39% compared to 2019. This component, which represents the revenues derived from the hotel operations, including hotel room, food, and beverage sales, was greatly affected by the temporary closure of some hotels due to the pandemic, generating only \$421 Mn in 2020. In absolute terms, the biggest drop was registered by the other revenues from managed and financial properties component, which represents the amounts contractually reimbursed to Hilton by property owners. This component, which generated \$5 686 Mn in 2019, did not exceed \$2 707 Mn in 2020.

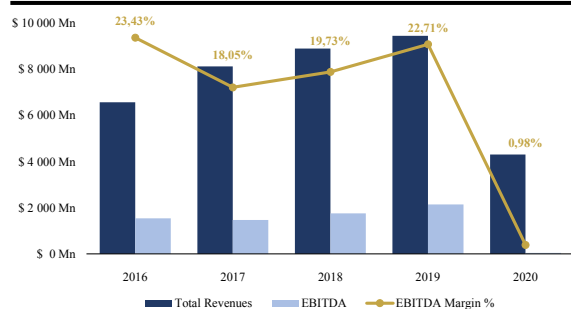
Concerning the other sources of revenue, it is relevant to mention that all of them also recorded decreases in their values, evidencing the brutal impact caused by the COVID-19 pandemic (Annex D).

**Figure 11: Revenues source and Revenue Growth %.** Bloomberg and Hilton 2020 annual report.

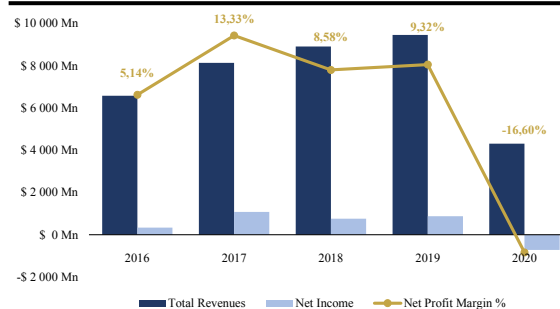


Figures 12 and 13 show the variation of the EBITDA (Earnings Before Interests, Taxes, Depreciations, and Amortizations) Margin and the Net Profit Margin, respectively. Both Margins reflect the poor performance of Hilton in 2020. If, on the one hand, EBITDA Margin recorded a much lower value than it had been registering until then, due to a decrease of \$2 105 Mn in EBITDA, on the other hand, the Net Profit Margin even registered a negative value, resulting from the Net Loss of \$715 Mn recorded in 2020.

**Figure 12: Total Revenues, EBITDA, and EBITDA Margin.** Bloomberg.



**Figure 13: Total Revenues, Net Income, and Net Profit Margin.** Bloomberg.



From the Operating Margin perspective, we can see in Figure 14 that was registered a negative variation close to 27 p.p., from 2019 to 2020. Such happened mainly due to an abrupt drop in the Operating Income, which registered a negative value of \$418 Mn. Thus, the Operating Margin, which until then had always recorded values above 13,00%, ended up

recording in 2020 the value of -9,71%, indicating the inability of Hilton to generate profit through its core operations.

Concerning Hilton's return ratios, which measure how effectively an investment is being managed, there is a point that is important to clarify. Figure 15 does not consider the Return on Equity (ROE)<sup>2</sup> between 2019-2020 since Hilton's amount of Equity Before Minority Interest had recorded negative values in those two years and because Hilton recorded a Net Loss of \$715 Mn in 2020. These two factors combined would generate an artificially high ROE. In fact, when a company has a Net Loss or negative Equity Before Minority Interest, ROE should not be calculated.

Therefore, considering only the period between 2016-2018, we conclude that Hilton's ROE followed a growth trend until 2018. In contrast, the Return on Assets (ROA) and the Return on Invested Capital (ROIC) appeared to have stabilized after 2017 until everything changed in 2020. Due to the Net Loss, Hilton's ROA recorded a negative value of -4,51%, suggesting that the company cannot use its assets effectively to generate income. Concerning ROIC, which also decreased in 2020, this one recorded a negative value of -3,25%. Such a decrease was motivated by an abrupt drop in the Net Operating Profit After Taxes (NOPAT), which registered a value of \$1 176 Mn in 2019 and a negative value of \$327 Mn in 2020, which indicates a Net Operating Loss (Annex E and F).

Figure 14: Total Revenues, Operating Income, and Operating Margin. Bloomberg.

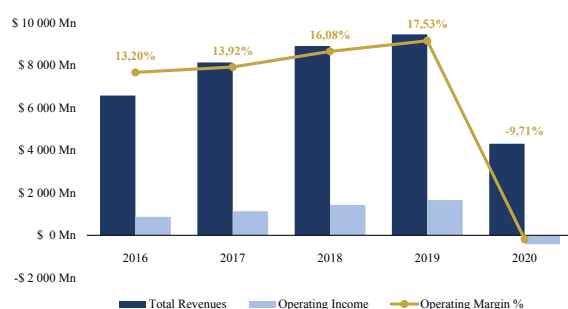
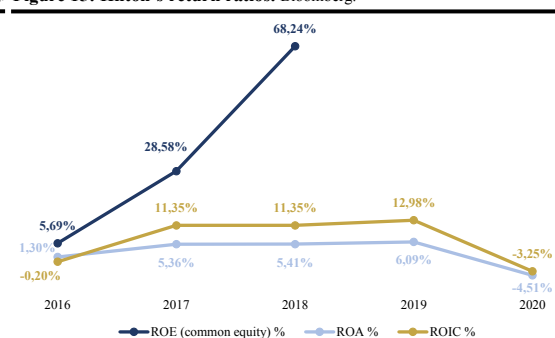


Figure 15: Hilton's return ratios. Bloomberg.



### 2.1.5.2. Liquidity

Regarding the Liquidity ratios, which indicate the ability of a company to meet its short-term obligations, we had similar trends recorded in the Current Ratio, the Quick Ratio, and the Cash Ratio.

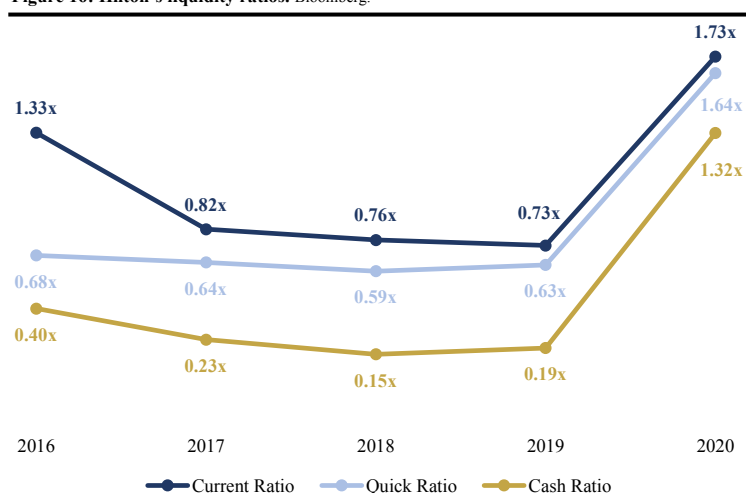
<sup>2</sup> We considered the Return on Common Equity.

Figure 16 shows that the Current Ratio, which has remained constant after dropping considerably in 2016, recorded a considerable rise in 2020. The reason for such an increase were the current assets, which registered an increase of almost \$2 109 Mn. As of 31 December 2020, the company had 1.73x more current assets than current liabilities, indicating the ability of the company to pay off its current liabilities (payable within one year) with its total current assets.

The last two ratios, the Quick and the Cash Ratio, are more conservative liquidity ratios as they exclude all assets that are more difficult to convert into cash, i.e., are not so liquid. The big difference between them lies only in the fact that the Cash Ratio takes the test of liquidity even further. In 2020, the values recorded by the Quick Ratio and the Cash Ratio were 1.64x and 1.32x, respectively. Thus, we conclude that the company does not demonstrate a lack of assets that are easy to convert into cash, so it is not likely that Hilton encounters serious problems paying off its short-term liabilities. Notice that the Cash Ratio is slightly lower as it only represents the most liquid assets.

All these increases were mainly motivated by a rise in the cash and cash equivalents component, which in 2020 amounted to \$3 218 Mn, a value five times bigger than the one recorded in 2019 (Annex G).

Figure 16: Hilton's liquidity ratios. Bloomberg.



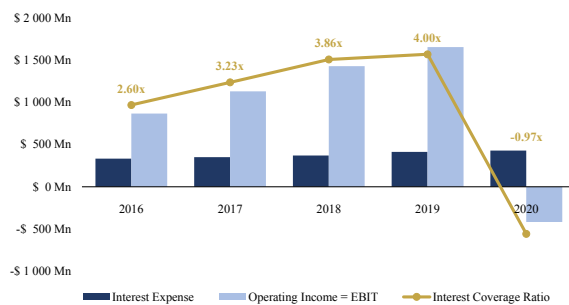
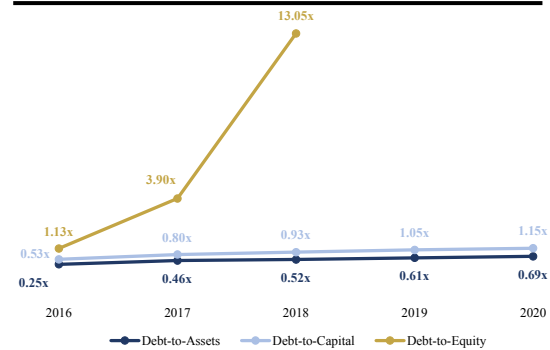
### 2.1.5.3. Solvency

Solvency ratios, also known as Leverage ratios, are similar to Liquidity ratios since they also measure the ability of a company to pay off its obligations. However, Solvency ratios focus more on the long-term sustainability of a company rather than its current liability payments.

As we can see in Figure 17, the Interest Coverage Ratio of Hilton was favourably evolving until it registered a considerable drop in 2020 due to the drastic reduction in the Earnings Before Interests and Taxes (EBIT). This negative Interest Coverage Ratio indicates that Hilton ended 2020 with no capacity to cover or pay its current debt obligations with its operating profit.

Regarding the ratios presented in Figure 18, it is relevant to mention that the Debt-to-Equity for 2019 and 2020 was not estimated since the shareholder's equity accounting values for those years were negative. The Debt-to-Equity tells us how much debt a company has per \$1,00 of equity, so a negative ratio is not meaningful. In this way, we can only conclude that until 2018, the Debt-to-Equity, which followed a growth trend, contrasted with the stagnation trend registered by the Debt-to-Assets and the Debt-to-Capital. The value recorded for Debt-to-Equity in 2018 demonstrates that Hilton had 13.05x more total debt than shareholder's equity. Such value is quite worrying because it indicates that the company is financed predominantly by debt rather than equity, which is dangerous since debt financing requires regular interest payments. Concerning Debt-to-Assets, which represents the portion of assets funded with debt, it reached a value of 0.69x in 2020, representing an increase of 33,38% compared to 2018. Similarly, the Debt-to-Capital recorded a value of 1.15x in 2020, representing an increase of 23,44%. Both increases were due to a significant increase in the short- and long-term debt by \$4 346 from 2018 to 2020. This growth in debt can be explained by the company's need to finance the losses recorded during 2020. Since the cash from operations was significantly lower than recorded until then, the company had to go into debt to be able to respond to the difficulties imposed by the pandemic.

Regardless of the ratios considered, what is vital to mention is that very high values are not healthy, as they indicate a heavily leveraged company. These debt ratios are meaningful to investors, whose equity investments could be put at risk if the debt level is too high. These ratios are of particular concern when a company wants a credit rating agency to assign a rating to one of its debt securities. As the ratios reveal a high debt burden, the rating agency may assign a low rating, increasing the interest cost of the securities. Typically, companies within the hospitality industry have a lot of long-term liabilities in the form of debt, along with current liabilities. This debt is usually related to the financing of the hotels. So, it is not surprising that Hilton registered a large amount of debt, but it should warn of the importance of carrying out an effective debt management (Annex H).

**Figure 17: Interest Expense, EBIT, and Interest Coverage Ratio.** Bloomberg.**Figure 18: Hilton's debt ratios.** Bloomberg.

## 2.2. Hospitality Industry

Defining the hospitality industry, unlike other industries, is not an easy task since there is not one clear product. According to Walker and Walker (2014), the word hospitality comes from *hospice*, an old French word meaning to provide care or shelter for travellers. Nowadays, hospitality has gained a broader meaning referring to several businesses and services linked to leisure.

Along with the hospitality industry, there is the tourism sub-industry. According to Walker and Walker (2014), if we consider both as only one great industry, it comprises five distinct areas: Travel, Assembly and Event Management, Restaurants and Managed Services, Recreation, and Lodging.

The following analysis is based on the data provided by the World Travel & Tourism Council (WTTC), one of the most reliable entities regarding hospitality and tourism.

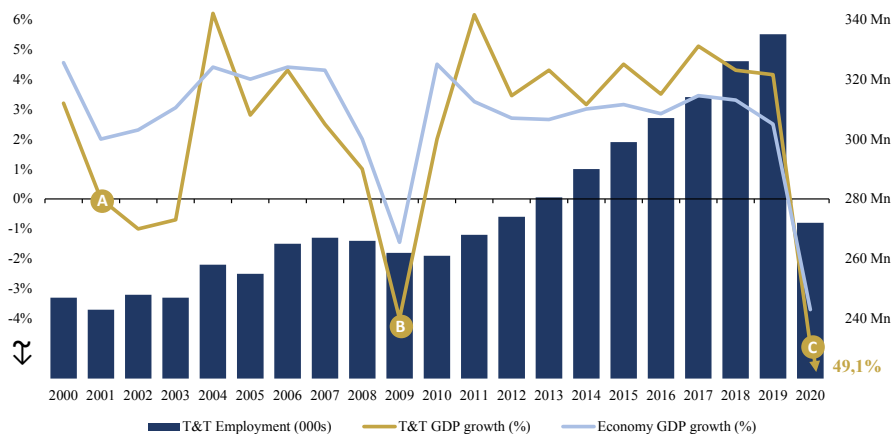
### 2.2.1. Macroeconomic Environment

During the last century, there has been a global trend towards an increased and unrestricted movement of people. However, an unprecedented pandemic in 2020 changed everything.

In 2020, Travel & Tourism (T&T) GDP growth registered a decrease of 49,10% compared to the previous year, the largest drop recorded until then. Figure 19 shows how impactful COVID-19 [C] was by comparing it with the September 11 attacks [A] and the global financial crisis of 2009 [B]. This decrease was so abrupt that the world economy's GDP growth surpassed the T&T GDP growth for the first time in nine years. T&T GDP, which accounted for 10,40% of global economy GDP in 2019, contributed only 5,50% in 2020, equivalent to \$4 671 Bn. Another relevant indicator is employment since T&T has been an excellent driver for job creation and a dynamic engine of employment opportunities. The results presented

demonstrate, once again, the brutal impact of COVID-19, causing the loss of 62 million jobs during 2020.

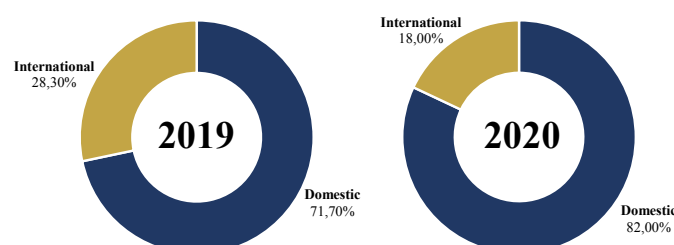
**Figure 19: Economic impact timeline.** Global Economic Impact and Trends 2021 report.



Furthermore, it remains to consider the distribution of visitor spending, as it helps to justify the change in T&T GDP contribution from certain regions of the world, analysed in the following pages.

According to the WTTC report, the visitor total spending in 2020 was \$2 878 Bn, representing a decrease of about 51,93% compared to 2019. As we can see in Figure 20, the distribution between domestic and international visitor spending has become less equitable. The international visitor spending, representing 28,30% of the visitor total spending in 2019, accounted only for 18,00% in 2020. Conversely, domestic visitor spending represented 82,00%, a slight percentual rise compared to 2019. However, this relative rise of 10,30% represents an absolute decrease of \$1 935 Bn, -45,05% in relative terms compared to 2019. Regarding international visitor spending, it decreased by 69,40%, a more severe reduction due to the additional travel restrictions for international tourists in 2020. In absolute terms, it represented a decrease of \$1 174 Bn.

**Figure 20: Domestic against International Spending.** Global Economic Impact and Trends 2021 report.

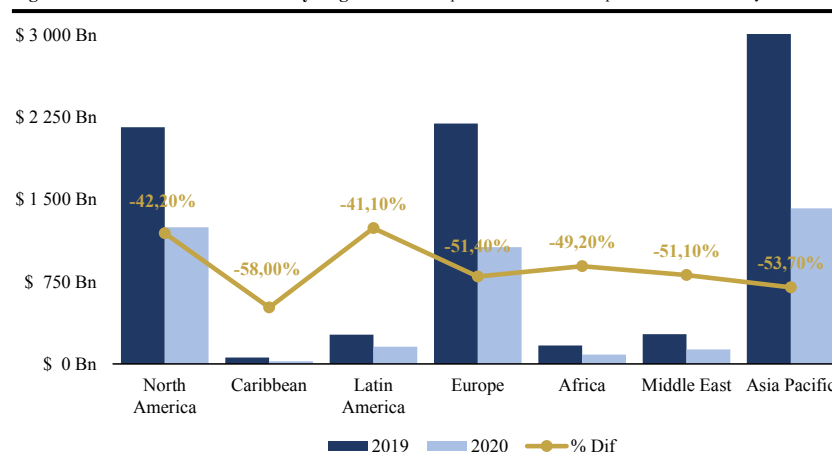


As we can see in Figure 21, the regions of the world that recorded the most significant declines in terms of the T&T GDP contribution in 2020 were the Caribbean, Asia Pacific, Europe, and the Middle East. These four regions recorded decreases of +50,00% compared to 2019. After analysing the variations in visitor spending, we can conclude that international visitor spending represented the most significant drop, in relative terms, compared to domestic visitor spending. Thus, it is not surprising that the smaller regions that are most dependent on international markets have almost collapsed, as was the case of the Caribbean and the Middle East.

For larger regions, such as Asia Pacific and Europe, the justification for such drastic declines goes beyond the decreasing of international visitor spending. Both regions experienced several lockdowns and numerous restrictions on the free movement of people within their own countries, making the impact felt twofold, on the one hand by the absence of international visitors, and on the other hand by the limitations imposed on T&T within their borders.

For regions such as Africa, North America, and Latin America, the impacts suffered appear to have been less severe. However, if we consider North America, the decrease of 42,20% represented in absolute terms the third-largest drop, equivalent to \$910 Bn.

**Figure 21: T&T GDP contribution by Region.** Global Impact and Trends 2021 report and Author's Analysis.



Even though 2020 was a disaster, the WTTC believes that what happened may be used as a lesson for progress. Through the To Recovery & Beyond report, the council identified some trends and explored changes that may be needed to sustain travel and tourism in the future.

From a demand perspective, COVID-19 has changed the preferences and behaviours of travellers, which are now looking for something more familiar, reliable, and safer. Domestic and regional vacations, as well as outdoor activities, are the preferences in the short-term.

While there is still a lot of uncertainty about the longevity of these changes, the T&T sector has a unique opportunity to rethink and update existing business models in partnership with local communities as a solution to offer tourists what they most want. Additionally, it is essential that companies also participate in the discussion of sustainability since environmental problems are affecting the quality of human life and, consequently, businesses. It is also important to mention social sustainability as we face a growing wave of support for diversity and inclusion in society. Thus, given the high participation of women, minorities, and youth compared to other sectors, T&T should demonstrate the ability to protect and further engage vulnerable groups, reducing poverty and inequality.

## **2.2.2. Competition**

### **2.2.2.1. Key Performance Indicators**

According to Verot (2021), co-founder of HotelMinder, the Key Performance Indicators (KPIs) for hotels are the best metrics to assess a hotel's financial performance. We considered the three main KPIs for hotels: the Occupancy Rate, the Average Daily Rate, and the Revenue Per Available Room.

The first indicator, the Occupancy Rate, is widely used in the hospitality industry, and it represents the total number of room nights sold divided by the total number of room nights available at a hotel or group of hotels for a given period. Therefore, it is an indicator of demand and helps managers determine the achievable Average Daily Rate pricing ranges as demand for hotel rooms increases or decreases.

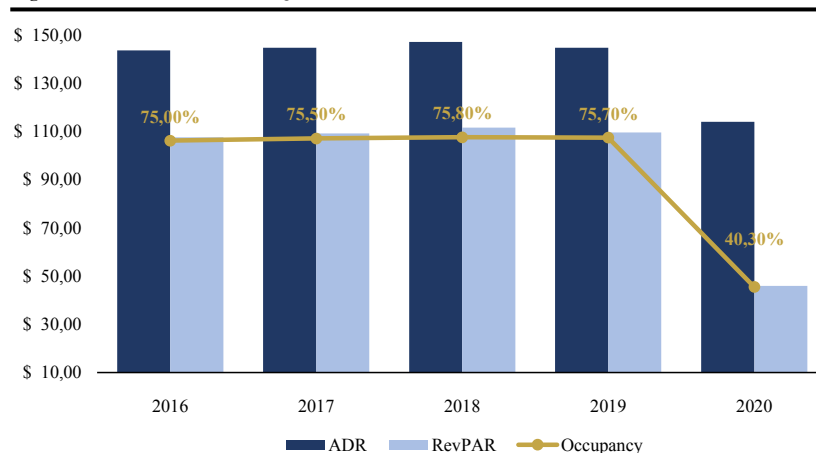
The Average Daily Rate (ADR), which indicates the average revenue earned for an occupied room, is calculated by dividing the hotel room revenue by the total number of room nights sold for a given period. Therefore, it represents a good metric because it allows companies to access information regarding the pricing environment and the customers' trends.

The last indicator analysed is named Revenue Per Available Room (RevPAR). RevPAR is calculated by dividing the hotel room revenue by the total number of room nights available, sold or not, to guests for a given period or by multiplying the Occupancy Rate by the ADR. In

this way, it represents the most useful indicator because it provides a metric correlated to those two primary key drivers of performance.

Figure 22 shows that until 2019 Hilton recorded very stable values concerning any of the KPIs. The considerable variation occurred in 2020, with Hilton recording values much lower than usual. It is relevant to mention that although the company's RevPAR was affected by the ADR reduction, the major impact was caused by the Occupancy Rate decrease. Given the travel restrictions due to the COVID-19 pandemic, the Occupancy Rate fell by 46,76% compared to 2019. The region of the world that contributed most to this significant decrease, according to the Hilton 2020 annual report, was Europe, which varied on -47,80% registering an Occupancy Rate of 28,60%.

Figure 22: Hilton's KPIs. Bloomberg.



As we can see in Table 5, Hilton was one of the companies that recorded the sharpest declines in all KPIs in 2020, compared to some of the direct competitors listed in the annual report. However, despite such drastic drops, Hilton continued to stand out for its higher values compared to its competitors. The main highlight is the RevPAR, as only Marriott obtained a value higher than the RevPAR obtained by Hilton.

To take the lead and overtake Marriott in this KPI, Hilton will have to work to increase its ADR since the Occupancy rate does not seem to be the problem, as Marriott registers a rate below the Hilton rate. Therefore, Hilton may adopt strategies that will enhance customers' experience, such as shuttle transfers, tours, or activities to increase the ADR, which will lead to an increase in the RevPAR.

Table 5: KPIs comparison between Hilton and its competitors. Bloomberg.

| KPIs             | Occupancy     |                | ADR              |                | RevPAR          |                |
|------------------|---------------|----------------|------------------|----------------|-----------------|----------------|
|                  | 2020          | YoY            | 2020             | YoY            | 2020            | YoY            |
| <b>Hilton</b>    | <b>40,30%</b> | <b>-46,76%</b> | <b>\$ 114,03</b> | <b>-21,24%</b> | <b>\$ 46,00</b> | <b>-58,05%</b> |
| Marriott         | 35,50%        | -51,83%        | \$ 130,40        | -28,59%        | \$ 46,28        | -60,55%        |
| Intercontinental | 39,50%        | -43,73%        | \$ 94,72         | -18,32%        | \$ 37,41        | -54,07%        |
| Hyatt            | 48,60%        | -34,77%        | \$ 160,00        | -12,55%        | \$ 41,00        | -69,91%        |
| Whyndham         | ---           | ---            | ---              | ---            | \$ 24,51        | -32,59%        |
| Choice           | 45,60%        | -27,50%        | \$ 71,63         | -12,02%        | \$ 32,70        | -36,12%        |

### 2.2.2.2. SWOT Analysis

Table 6 presents Hilton's SWOT Analysis, a methodology widely used to characterize the company's competitive position.

Table 6: Hilton's SWOT Analysis. Author's Analysis.

| Strengths                                                                                                                                                                                                                                                                                                                                                                                                       | Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>· <b>Global presence with high recognition</b></li> <li>· <b>Brand portfolio diversity</b></li> <li>· <b>Growth potential</b>, as Hilton has many development project pipelines</li> <li>· <b>Loyal customers</b>, resulting from the quality of services provided by Hilton</li> </ul>                                                                                  | <ul style="list-style-type: none"> <li>· <b>Significant dependence on U.S. markets</b></li> <li>· <b>Inability to effectively manage its global operations</b> since it owns a high number of hotels</li> <li>· <b>High debt levels</b></li> </ul>                                                                                                                                                                                             |
| Opportunities                                                                                                                                                                                                                                                                                                                                                                                                   | Threats                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <ul style="list-style-type: none"> <li>· <b>Take advantage of the potential of emerging markets</b> to invest even more since Hilton is a prestigious company in such markets</li> <li>· <b>Focusing on the technological progress</b></li> <li>· <b>Explore the possibilities that the mid-level budget hotel industry offers</b> instead of focusing only on the upper-level budget hotel industry</li> </ul> | <ul style="list-style-type: none"> <li>· Since it belongs to a Cyclical Industry, <b>revenues are strongly correlated to the overall economy's performance</b></li> <li>· <b>The growing popularity of emerging platforms like Airbnb</b>, which have the potential to change the game rules</li> <li>· <b>Changes in consumer preferences for hotel services</b>, including rooms, food, beverage, and other products and services</li> </ul> |

### **3. Valuation**

As mentioned before, Hilton's valuation will result from the outputs of two models. The first model adopted is the FCFF, a DCF model. Through this model, we considered an explicit forecasting period of five years (2021-2025), where we discounted the cash flows projected at the WACC discount rate. Then, we assumed a TGR that allowed us to project future cash flows (the ones after the explicit forecasting period). After obtaining the target share price, we performed a sensitivity analysis to capture the impact of the assumed TGR and WACC on the results.

Afterwards, we performed a Relative Valuation applying the two most widely used multiples: the P/E and the EV/EBITDA. As mentioned in the literature review, it is recommended to use forward-looking multiples rather than historical multiples, as these deliver a more reliable result. Therefore, we considered the multiples for the Next Twelve Months based on the projected performance. Then we established a peer group composed of companies that operate in the same kind of business as Hilton, as well as the rules used to identify possible outliers. After completing all these steps, it was possible to estimate the target share price of Hilton.

Finally, a detailed analysis of the values obtained was carried out.

#### **3.1. Assumptions**

First of all, we had to make a few assumptions that allowed the forecast of the variables needed to carry out this valuation exercise. To accomplish such a task, we considered the financial data of Hilton between 2016-2020. Then, we estimated the median of such values and considered them projection drivers. We did not consider the mean because the values recorded in 2020 were very different from those recorded until then. Thus, given the existence of outliers in the sample, it is recommended to use the median instead of the mean. In this way, we fulfilled all the requirements that allowed us to complete the valuation exercise.

Next, we will present the assumptions made and their rationale.

##### **3.1.1. Revenues**

Making a weighted and realistic revenue growth estimate is essential to obtain accurate projections. Despite being a very complex exercise, the highest degree of rigour is required at this stage as it is the most important assumption of the entire master's project since several

other assumptions depend on this item. As the future is still quite uncertain concerning the development of this pandemic crisis, it is essential to make a projection that reflects the situation expected for the following years.

Therefore, to make a more reliable assumption, we will assume that Hilton will have the same revenue growth as the one for the hotel industry for 2021-2025, as projected by the Statista website. Since Statista has been the market leader in providing reliable business data, it seems to be the safest source of revenue projections. Furthermore, these projections for the industry reflect what is expected to happen with Hilton, i.e., a significant growth in the next few years and an eventual stabilization after that.

In this way, Hilton's revenues were projected for the next five years considering the projection made for the hotel industry, as depicted in table 7.

**Table 7: Revenue growth projections.** Statista and Author's Analysis.

| In Millions of USD    | 2019            | 2020            | 2021 (F)        | 2022 (F)        | 2023 (F)         | 2024 (F)         | 2025 (F)         |
|-----------------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| <b>Revenue Growth</b> | 6,13%           | -54,43%         | 42,00%          | 57,10%          | 19,80%           | 14,10%           | 9,30%            |
| <b>Revenues</b>       | <b>\$ 9 452</b> | <b>\$ 4 307</b> | <b>\$ 6 116</b> | <b>\$ 9 608</b> | <b>\$ 11 511</b> | <b>\$ 13 134</b> | <b>\$ 14 355</b> |

Therefore, Hilton will see a full revenue recovery from the impact of COVID-19 in 2022. This scenario is quite optimistic for some, for others pessimistic. However, this projection is in line with the projections made by several analysts, such as Riaz (2021), Hospitality Advisor Leader of EY. According to him, a very likely scenario refers to a full recovery from the impact of this pandemic crisis in the first quarter of 2022, which supports our decision to project Hilton's revenue growth according to the projection made by the Statista website for the hotel industry.

### 3.1.2. EBIT

To project the EBIT, we considered that each of the variables that constitute the EBIT varies in proportion to the revenues. It is reasonable to consider this assumption since Hilton has always presented constant values of Gross Profit, Other Operating Income, and Operating Expenses as percentage of the revenues (except for 2020, when variations more abrupted were registered).

Table 8 shows the projection of Hilton's EBIT considering for each projection driver the median of the last five years.

**Table 8: EBIT projections.** Bloomberg and Author's Analysis.

| In Millions of USD               | 2016          | 2017            | 2018            | 2019            | 2020           | 2021 (F)      | 2022 (F)        | 2023 (F)        | 2024 (F)        | 2025 (F)        |
|----------------------------------|---------------|-----------------|-----------------|-----------------|----------------|---------------|-----------------|-----------------|-----------------|-----------------|
| <b>1. Gross Profit</b>           | \$ 5 297      | \$ 6 862        | \$ 7 574        | \$ 8 198        | \$ 3 687       | \$ 5 201      | \$ 8 171        | \$ 9 789        | \$ 11 169       | \$ 12 208       |
| Revenues %                       | 80,55%        | 84,39%          | 85,04%          | 86,73%          | 85,60%         | 85,04%        | 85,04%          | 85,04%          | 85,04%          | 85,04%          |
| <b>2. Other Operating Income</b> | \$ 0          | \$ 0            | \$ 0            | \$ 0            | \$ 0           | \$ 0          | \$ 0            | \$ 0            | \$ 0            | \$ 0            |
| Revenues %                       | 0,00%         | 0,00%           | 0,00%           | 0,00%           | 0,00%          | 0,00%         | 0,00%           | 0,00%           | 0,00%           | 0,00%           |
| <b>3. Operating Expenses</b>     | \$ 4 429      | \$ 5 730        | \$ 6 142        | \$ 6 541        | \$ 4 105       | \$ 4 232      | \$ 6 649        | \$ 7 966        | \$ 9 089        | \$ 9 934        |
| Revenues %                       | 67,35%        | 70,47%          | 68,96%          | 69,20%          | 95,31%         | 69,20%        | 69,20%          | 69,20%          | 69,20%          | 69,20%          |
| <b>EBIT (= 1 + 2 - 3)</b>        | <b>\$ 868</b> | <b>\$ 1 132</b> | <b>\$ 1 432</b> | <b>\$ 1 657</b> | <b>-\$ 418</b> | <b>\$ 969</b> | <b>\$ 1 522</b> | <b>\$ 1 823</b> | <b>\$ 2 081</b> | <b>\$ 2 274</b> |

### 3.1.3. Depreciation and Amortization

For the projection of Depreciation and Amortization, since historical results have not shown a general trend as a percentage of any of the items usually considered, such as revenues or property, plant, and equipment (PP&E), we decided to use an alternative approach.

Since Depreciation and Amortization correspond to the difference between EBITDA and the sum of EBIT and Operating Lease Rental Expense Adjustments, we decided to project each of these items as a percentage of the revenues to obtain the Depreciation and Amortization projection. Usually, it is not necessary to consider the Operating Lease Rental Expense Adjustments. However, according to Bloomberg, since Hilton adopted a New Leasing Accounting Standard Codification (ASC 842) in 2019 and 2020, we must consider such adjustments.

It is also important to mention that the values presented for the last five years of Depreciation and Amortization were taken from the Cash Flow Statement and not from the Income Statement. Sometimes the values depicted for the same item, such as Depreciation and Amortization, differ from one statement to another. In this case, the Cash Flow Statement is the only reliable place to get Depreciation and Amortization values because it accounts for accumulated expenses.

Table 9 presents the projection of Depreciation and Amortization according to the assumptions made.

**Table 9: Depreciation and Amortization projections.** Bloomberg and Author's Analysis.

| In Millions of USD                                  | 2016          | 2017            | 2018            | 2019            | 2020           | 2021 (F)      | 2022 (F)        | 2023 (F)        | 2024 (F)        | 2025 (F)        |
|-----------------------------------------------------|---------------|-----------------|-----------------|-----------------|----------------|---------------|-----------------|-----------------|-----------------|-----------------|
| <b>1. EBITDA</b>                                    | \$ 1 541      | \$ 1 468        | \$ 1 757        | \$ 2 147        | \$ 42          | \$ 1 207      | \$ 1 896        | \$ 2 271        | \$ 2 591        | \$ 2 832        |
| EBITDA Margin %                                     | 23,43%        | 18,05%          | 19,73%          | 22,71%          | 0,98%          | 19,73%        | 19,73%          | 19,73%          | 19,73%          | 19,73%          |
| <b>2. Operating Lease Rental Expense Adjustment</b> | \$ 0          | \$ 0            | \$ 0            | \$ 144          | \$ 129         | \$ 0          | \$ 0            | \$ 0            | \$ 0            | \$ 0            |
| Revenues %                                          | 0,00%         | 0,00%           | 0,00%           | 1,52%           | 3,00%          | 0,00%         | 0,00%           | 0,00%           | 0,00%           | 0,00%           |
| <b>3. EBIT</b>                                      | <b>\$ 868</b> | <b>\$ 1 132</b> | <b>\$ 1 432</b> | <b>\$ 1 657</b> | <b>-\$ 418</b> | <b>\$ 969</b> | <b>\$ 1 522</b> | <b>\$ 1 823</b> | <b>\$ 2 081</b> | <b>\$ 2 274</b> |
| <b>Depreciation and Amortization (= 1 - 2 - 3)</b>  | <b>\$ 673</b> | <b>\$ 336</b>   | <b>\$ 325</b>   | <b>\$ 346</b>   | <b>\$ 331</b>  | <b>\$ 238</b> | <b>\$ 373</b>   | <b>\$ 447</b>   | <b>\$ 510</b>   | <b>\$ 558</b>   |



















































