VALUATION AND ANALYSIS OF REPSOL S.A.

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Abstract.

Business valuation is a study that aims to determine the current economic value of the elements that make up the assets of an entity. On the other hand, the intrinsic value of a company tries to show the wealth that a company can generate, considering the risk that this wealth creation entails for the company.

This final thesis is aimed at obtaining the intrinsic value of Repsol S. A., a Spanish multinational energy and petrochemical company with a high market share in the oil sector. In addition to calculating the intrinsic value of this entity, this work also focuses on providing information about the individual situation of Repsol and its possible variations in the future, based on a SWOT analysis and the analysis of its accounting information.

Keywords: Business Valuation, Intrinsic Value, Current Economic Value.

1. Repsol.

1.1. Information and history of Repsol.

Repsol S. A. is a Spanish multinational energy and petrochemical company (whose head office is located in Madrid) that was founded in 1987.

Said multinational, originally, was formed by a set/group of companies, which were part, before jointly integrating, the National Institute of Hydrocarbons (NIH), and, in addition, they were engaged in the exploration, exploitation, production, transportation and refining of oil and gas.

Repsol not only produces and sells oil and gas, but also, as a consequence of manufacturing these products, this allows them to produce and sell derived products such as petrochemicals and natural gas.

Repsol's origins date back to 1927 with the creation of CAMPSA, a Spanish public company dedicated to the production and distribution of fuels.

It was in 1987, when the Spanish government made the decision to privatize CAMPSA, and as a consequence of this, Repsol was created (under the presidency of Óscar Fanjul, former president of the NIH). Repsol was structured into 5 internal divisions: Repsol Exploration (formerly Hispanoil), Repsol Petróleo (formerly Enpetrol), Repsol Butano (formerly Butano), Repsol Química (formerly Alcudia) and CAMPSA.

After the privatization of CAMPSA and the appearance of Repsol, the latter became a private company (listed on the stock market, both in Spain and in New York) due to the fact that the state began a public sale offer of 26% of Repsol's capital, and the multinational began to expand worldwide acquiring assets in some countries such as Argentina, Peru, Brazil and Mexico.

A decade later, in 1999, Repsol merged with YPF (Argentine state oil company) in order to form Repsol YPF. But, in 2012, Repsol sold its stake in YPF because the Argentine government carried out the nationalization of this company.

Nowadays, Repsol is one of the largest energy companies in Europe, since more than 30 countries have a presence.

Due to the global impact of this company, Repsol has committed to becoming a green energy company.

1.2. Repsol subsidiaries.

Repsol has been expanding since its creation both nationally and internationally and, for this reason, has created different subsidiaries in different geographical areas.

The subsidiaries created by Repsol are the following:

-Repsol Sinopec Brazil: Repsol arrived in Brazil in 1997. For two decades it has participated in the entire energy and gas value chain and has been involved In the import, marketing and distribution of basic oils and petrochemical products of reference.

Since 2010, upstream activities have been carried out thanks to Repsol Sinopec Brazil.

-Petronor (Petróleos del Norte, S. A.): is a Spanish oil company, subsidiary of the Repsol group. It was founded in Bilbao (Vizcaya) in 1968. In 1989, Petronor became part of the Repsol energy group, and it became a virtual subsidiary of Repsol, but maintaining its own identity.

Its social objective is the refining and commercialization of different petroleum products, as well as their derivatives.

- Dynasol: Dynasol is a rubber business through a joint venture with the Mexican Grupo Kuo. Grupo Dynasol is one of the leading companies in the synthetic rubber market, and within its sector, ranks among the 10 largest companies worldwide. Dynasol Group is headquartered in Madrid and has operational centers and office in Spain, Mexico, China and the United States.

With this subsidiary, Repsol shows us that it has not only implemented a market development strategy, but it has also carried out a product development strategy.

-Repsol Exploration Peru, S. A.: since 1996, Repsol has been carrying out hydrocarbon production and marketing activities in Peru and its derivatives, in addition to working in the production of natural gas, LPG (liquefied petroleum gas) and associated liquids. Repsol has, in Peru, the main oil refinery in the country and one of the most important in Latin America, La Pampilla.

Table 1: Repsol subsidiaries and percentage of ownership in each one.

SOCIETY	STAKE
Repsol Sinopec Brazil	60%
Petronor	85,98%
Dynasol	50%

| Repsol Exploration Peru, S. A. | 100% |

Source: adapted from Wikipedia (30 May 2023).

1.3. Evolution of the oil industry in Spain.

In the 1920s the Spanish market was dominated by foreign companies, and, therefore, the national market imported all the oil it consumed.

But, after this foreign domination in Spain, finally, the oil industry in Spain has experienced an interesting evolution over time.

It was in 1964 when oil was discovered in Spain after the discovery of the first oil field found in Campo de Ayoluengo, in the province of Burgos.

Subsequently, in the 1970s, several state companies arose with the aim of allowing them to exploit the oil deposits in Spain, such as CEPSA (Spanish Petroleum Company) and ENPETROL (National Petroleum Company). These two companies dominated most of the Spanish market.

In the 1990s, foreign companies began to enter due to liberalization of the oil market in Spain. With this liberalization, entered large companies such as BP, Shell and Repsol.

At the beginning of the 21st century, the Spanish oil industry was affected for two reasons: the economic crisis and the decline in oil demand in Europe. This, led to the fact that some companies closed their doors (such as ENPETROL).

It is not only bad news in this sector after the crisis because the oil industry in Spain has found new opportunities in the production of natural gas and renewable energy. In 2019, Spain became the leading wind energy country in Europe as Spain increased its natural gas production by 15%.

In conclusion, the evolution of the oil industry in Spain has been marked by the liberalization of the market, the entry of foreign companies and adaptation to new challenges and opportunities.

1.4. Analysis of Repsol's competitors.

Repsol is not the only oil company that operates in the national market. As a result of this, Repsol operates in a market with competitors with high market shares, both national and international.

Repsol not only carries out the activity of producing and selling oil and gas, but also produces, as a result of the manufacture of the aforementioned, derived products, and

therefore it is possible that it will also find competitors in the other sectors of activity and not only in the oil sector.

In addition to everything mentioned above, Repsol also finds competition outside the national framework, due to the fact that it has subsidiaries distributed throughout the world, such as Dynasol (with operating centers in Spain, Mexico, China and the United States), Repsol Sinpoec Brasil (Brazil), and Repsol Exploración Perú, S. A. (Peru).

Of all the possible competition that Repsol faces, we are only going to report briefly on two of the main competitors in the Spanish market, Cepsa and BP.

1. **Cepsa:** it is a Spanish company whose foundation was in 1929 and is characterized because it was the first private oil company in Spain. Its headquarters are located in Madrid. It is an integrated energy company that is present in all phases of the oil value chain: oil and gas exploration and production, refining, transportation and marketing of oil derivatives and natural gas, biofuels, cogeneration and marketing of electric power and petrochemicals, in which it manufactures and markets raw material for the production of high value-added products. As we can see in the activity carried out by Cepsa, it is a direct competitor of Repsol in different sectors, both in the production and marketing of oil and gas and in the sale of derivative products (such as natural gas and petrochemical products). Cepsa is the third Spanish industrial group by turnover volume. In its sector and from a global point of view, Cepsa is one of the 35 largest companies. It is also among the top ten European companies according to turnover volume.

2. **BP:** is an energy company resulting from the merger of several companies in the sector, including Arco, Amoco, Castrol, and Aral. BP is mainly engaged in the production and marketing of oil and natural gas. BP is headquartered in London. According to its market position, BP ranks 18th (according to Forbes magazine) and is one of the largest companies in the sector worldwide. It is also the third largest private oil and gas company after ExxonMobil and Royal Dutch Shell.

   With these data related to BP's importance on a global scale in the oil sector, we can affirm that it is one of Repsol's strongest direct competitors, both nationally and internationally.

Table 2: Fuel Market Shares in 2010.

	FUEL MARKET SHARES IN 2010			
	GASOLINE 95		GASOIL A	
	Sales	Service Stations	Sales	Service Stations
Repsol	45%	39%	45%	38%
Cepsa	16%	17%	16%	16%
Bp	12%	7%	9%	7%
Galp	5%	7%	6%	7%
Disa	6%	5%	5%	5%
Others	16%	25%	19%	27%

Source: own elaboration based on information from Mundo de la Empresa (15 December 2012).

As can be seen in the table above, in 2010, Repsol had a much higher market share, both in the sale of Gasoline 95 and Gasoil A and in service stations for both types of fuel, compared to its strongest competitors (such as Cepsa and BP) and other competitors in the same sector but which are less relevant to Repsol, although they should not be forgotten.

Below, bar charts will be shown reflecting the above table, where the first chart refers to the Gasoline 95 market share of the companies mentioned in the table, and the second image reflects the bar chart of the Gasoil A market shares of these same companies.

Figure 1: Gasoline market share in terms of sales and service stations.
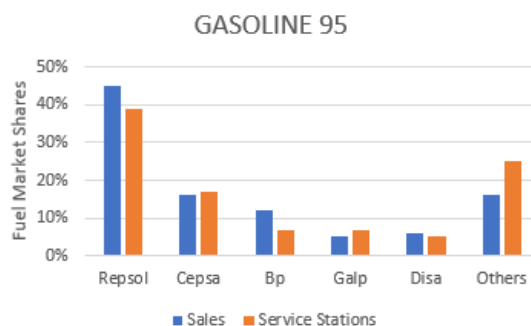
Source: own elaboration based on the information provided by the image published in Mundo de la Empresa (15 December 2012).

Figure 2: Gasoil market share in sales and in service stations.
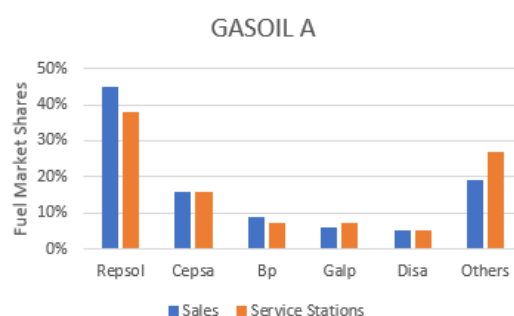
Source: own elaboration based on the information provided by the image published in Mundo de la Empresa (15 December 2012).

1.5. Repsol's competitive advantages and SWOT analysis.

1.5.1 SWOT analysis.

In order to carry out the analysis of Repsol and its business valuation, one of the key concepts that will be the subject of this analysis is the SWOT analysis.

The SWOT analysis is an analysis technique that allows to highlight the current situation of the company, and to be able to make the appropriate strategic decisions. It is a common tool in a strategic plan as well as in a business plan or a market study.

The SWOT analysis consists of carrying out an analysis both externally (where we will determine Repsol's threats and opportunities) and internally (where we will study the company's strengths and weaknesses).

Having briefly explained what SWOT analysis is, we can now look at Repsol's SWOT analysis:

Table 3: Repsol's SWOT analysis.

Strengths	Weaknesses
-Size of the company -Presence throughout the country -Vertical integration	-High fixed costs -Reduced unrelated diversification
Opportunities	Threats
-Implementation of the regulation limiting the sulfur found in marine fuel oil -Energy transition	-Low-cost service stations -Oil reserves

Source: own elaboration.

Strengths:

-Size of the company: the size of the company favors it because, being such a large company, it can afford a reduction in its selling prices in those places where its competition is larger because this reduction could be offset by an increase in its selling prices in places where it has less or no competition. In addition, its size could allow it to take advantages of economies of scale.

-Presence throughout the country: Repsol's existence throughout Spain means that it receives large amounts of income as it has sales outlets throughout the country. In addition, the existence of sales outlets in both the Canary and Balearic Islands gives Repsol an advantageous position because there is a little competition in both archipelagos and tourism is very high.

-Vertical integration: Repsol is present in both the upstream area (comprising exploration and production activities) and the downstream area (including transportation, refining, and marketing activities), and as a result avoids potential problems with its customers and suppliers.

Weaknesses:

-High fixed costs: Repsol operates with high fixed costs, which makes it impossible to establish relatively low selling prices for its products and may cause competitors to gain market share if the latter establishes lower selling prices.

-Reduced unrelated diversification: Repsol's main business is oil exploitation, and therefore the company depends almost exclusively on this product. The risk involved in this dependence is very great because oil is a finite good and if it were to run out, it could cause, with a high probability, the bankruptcy of Repsol.

Opportunities:

-Implementation of the regulation limiting the sulfur found in marine fuel oil: Repsol has invested in its refineries in recent years, so that the company, has managed to make its refineries more competitive and better able to adapt to the implementation of the new sulfur limitation regulations, allowing Repsol to operate with heavier crudes.

-Energy transition: between 2018 and 2020 Repsol drew up a strategic plan stating that it expected to invest €15 billion, 53% of which was to be distributed in its exploration and production business, and 45% in its refining, chemicals, marketing, lubricants, trading, LPG, gas, and energy businesses and in low CO_2 emission assets. Not only is this the strategic plan carried out by Repsol to favor its adaptation to the energy transition, but Repsol establishes a strategic plan from 2021 to 2025 in which it will

make an investment of 19,300 million euros, of which 6,500 million will be allocated to low-carbon initiatives. In addition, Repsol aims to become a zero net emissions company by 2050.Therefore, with these investments planned by the company, we can affirm that Repsol is acquiring a very favorable position towards this energy transition and could achieve a highly competitive position with respect to other competitors that do not invest this amount of money in order to reduce their pollution.

Threats:

-Low-cost service stations: the emergence of low-cost service stations has affected Repsol's market share because Repsol tries to offer a better quality product than the low-cost stations, although many customers prefer to pay a little less and lower quality, thus causing Repsol's profits to suffer, either because they lose customers or because they are forced to reduce their selling prices (while maintaining the same level of costs) and therefore reduce their net profit margin.

-Oil reserves: as noted above in the section on reduced unrelated diversification (weaknesses), Repsol's main business is the manufacture and sale of oil and, therefore, its main source of income comes from here. Since oil is a non-renewable natural resource, it is a limited natural asset and could run out, causing Repsol to lose most of its business.

1.5.2. Repsol's competitive advantages.
Competitive advantage is a unique and sustainable characteristic over time that is not possessed by any other company competing in the same market (Michael Porter, 1980).

Competitive advantages can be of two types: cost leadership (producing products or services at a lower cost than the competition in order to obtain a higher profit margin from the sale, selling the products or services at market price) and differentiation (offering an innovative and high-quality product or service).

Repsol has a competitive advantage in product differentiation.

One the one hand, Repsol has designed Neotech fuels that provide four differential advantages: maximum quality, exclusive formulation, greater engine care and the guarantee of a leading brand. This causes many customers to believe that Repsol's products are more reliable and of a better quality than those of the competition, making customers prefer to pay a little more for a better product.

On the other hand, Repsol has several complements for its main product, such as: engine lubricants, window cleaners or the Waylet ecosystem (application designed, in principle, so that customers could pay at service stations without getting out of the vehicle and obtaining exclusive discounts, but Repsol wants to turn this application into a multiservice platform).

Another competitive advantage that differentiates Repsol from the competition is the location of its service stations in strategic locations such as: city arteries, national roads, highways and freeways. This means that Repsol has to bear higher costs, which are offset by profits because customers are willing to pay a little more for this availability.

Repsol not only finds tangible competitive advantages. Brand image plays a fundamental role in the company's gain in market share because customers are often willing to pay more for a product or service from a prestigious company than to pay less for products or services from companies with a lesser brand image.

We also find social responsibility actions carried out by Repsol through which the company obtains an advantageous competitive position over the competition, such as Repsol's goal of zero net emissions in 2050 throughout its value chain (including production emissions and those derived from the use of the products sold by the company). Nowadays, when it comes to buying a product or service, customers value highly the fact that a company carries out social responsibility actions compared to other companies that do not include them in their strategic plans.

2. Introduction to Business Valuation.

When valuing a company or any other object of valuation, such as a good, it is always thought that the value of such company or object is the price that the buyer pays to the seller, but this is not so, since, in order to carry out the valuation of a company or object, it is necessary to take into account many factors.

In addition to assessing the price that the seller attributes to a company or an object of purchase, it is also necessary to consider the value of the company or object of purchase. This value depends on many determining factors, among which, of great relevance are, on the one hand, the value that the seller attaches to the object of sale, and, on the other hand, the value that the buyer of said object is attaching to it. This last valuation criterion often leads to small conflicts between both parties because the valuation of both buyer and seller are subjective in nature, and it is very difficult for both parties to make valuations in such a way that both buyer and seller are satisfied.

According to this last explanation about the valuation of an object or company among different parties, it is worth mentioning Termes (1998), from IESE University of Navarra, who states the following: "the valuation of companies, like that of any other thing, good or service, is one of the factors involved in the decision to buy or sell the company or thing in question. In fact, the process through which a purchase-sale is arrived at is a negotiation in which each of the parties will put forward the reasons why it is willing to sell, or acquire, the company for no less, or no more, than such price."

The author Damodaran (2002) suggests that "all valuations are subject to numerous factors, both at the corporate and institutional level, which reduce the objectivity of valuation, so he believes that the best valuation will be the one that is subject to the least biased criteria."

Therefore, to make an assessment as objective as possible, a series of methods or models have been developed (some of them will be explained and put into practice in this final degree thesis).

2.1. Historical context of Business Valuation.

John Burr Williams was an American economist who is known, among many other things, for his publication "The Theory of Investment Value" in 1938. This theory had a great impact on the world of economics because Williams was one of the first economists to confront the "casino" view that many experts had of financial markets and asset pricing. Williams (1938) defended his theory by stating the following: "financial markets are, instead, markets, properly speaking, and that prices, therefore, should reflect the intrinsic value of an asset." In this theory, and supporting the author's idea, Williams proposed that "evaluation by the present value rule" should be the tool used in the valuation of an asset. Thus, this American economist established that, for a common stock, the long-term intrinsic value, is the present value of its future net cash flows, in the form of dividend distributions and sale price. In conclusion, and reinforcing this last idea, it is worth mentioning another highly prestigious economist, Gordon, who defined, with his model known as the constant rate increasing dividend model (1956), that the value of a share is the discounted value of all its future dividends.

Delving deeper into the historical framework, Benjamin Graham and David Dodd tried to explain value investing, first in Colombia Business School in 1928 and later in a book in 1934 called Security Analysis, as a process of buying shares at a price lower than their intrinsic value, whose explanation was supported by the supporters of value investing, among which the American investor and businessman Warren Buffett stands out.

Graham as consequence of the economic and financial problems that occurred in the Great Depression (also known as the crisis of 1929), gave greater consideration to the margin of safety (defined as the difference between the intrinsic value of a share and its market price) than to making investments in companies whose profitability could be very high but also the risk of the obtaining the latter, and, in a context where the world was plunged into a great world crisis, Graham defended this idea of the margin of safety with the aim of ensuring the money of the investment and earning only a small percentage of it.

But both the concepts of value and book value underwent a remarkable evolution from 1970 onwards. As a result, from the 1970s onwards, prestigious investors abandoned Graham's proposal to focus on the margin of safety when making an investment and proposed that it is more interesting to invest in companies that have lasting competitive advantages and are of higher quality, rather than investing in companies whose investment costs are lower, but whose quality is also lower as a result.

In the past, business valuation was not governed by solid criteria or principles that would determine the objectivity of this process. Therefore, those in charge of this work used to rely on subjective criteria in order to try to recommend or suggest to their clients about the companies under valuation.

Today, thanks to the studies of prestigious economists and the development of new technologies, this business valuation process has improved significantly, so that it is possible to carry out valuations with more solid information.

2.2. Business Valuation.

2.2.1. "What is meant by business valuation?"

"It is a process by which figures are assigned to events or economic facts, according to rules, with particular purposes to show the investor the recovery of his capital in the present, considering some variables that allow to determine its value in time.

Managing the figures for valuing companies is a simple procedure; it requires a precise knowledge of the mathematical tools for the application of a methodology, the integration of other elements such as strategic plans, based on an analysis of the weaknesses, strengths, threats, opportunities associated with the company, future projects, the capacity and preparation of the managers responsible for adequate management to best estimate the return on capital, strategic marketing, the cost of capital rate and adequate and reliable accounting information.

To value a company, it is necessary to combine knowledge of financial engineering, accounting, financial management, economics, law, business strategy, markets and certainly knowledge of other business sciences. Finally, it should not be forgotten that the mix of the above-mentioned elements and tools is affected by risk and subjective aspects, which leads to different results that even depend on who is doing the valuation. The value of the company cannot be estimated in isolation from the risk dimension given the uncertainty that may arise regarding the behavior of the economy and its impact on the company. Scenario analysis makes it possible to assess the risk of the business.

It is important to highlight that the added value of companies is not found in their physical assets, but in the intellectual capital of their managers, in the quality of information, in the capacity to generate funds and in strategic plans, which also makes the valuation activity more difficult to a certain degree." (Parra, 2013).

Business valuation is responsible for proposing different approaches and models to make the necessary estimates of the intrinsic value of a business.

2.3. Intrinsic value.

We can define the intrinsic value of a company as a theoretical construct whose objective is to show the wealth that the entity is capable of generating for its owners, taking into account the risk involved in this wealth creation (according to the financial and economic characteristics of the company).

This definition of intrinsic value is subject to two implications:

1- The intrinsic value of the entity is based on the business fundamentals or fundamentals, which are the company's own fundamental economic and financial characteristics.
2- Intrinsic value is guided by two fundamental pillars: profitability and risk.
   This means that if there are two companies with the same wealth creation potential, but company Y has a higher risk of achieving this wealth creation than company X, company X will have a higher intrinsic value than company Y, because there is a lower risk that company X will achieve wealth creation than company Y.

It is very important to bear in mind that the book value of a company is different from its intrinsic value, because the book value shows us the value of the company at a specific moment in time, without taking into account the company's wealth creation potential.

We must bear in mind that we cannot obtain the true intrinsic value of a company, because to do so we would need, on the one hand, to know all the information about the fundamentals of the entity, and, on the other hand, that all the information available to us to calculate the intrinsic value is perfect. Therefore, when calculating the intrinsic value of an entity, we must do so on the basis of estimates based on the best possible information available about the company.

Intrinsic value plays a very important role when making decisions about the company, since it acts as a guide in this decision-making process, according to the company's creation potential, and allows increasing the probability of making good decisions and decreasing the probability of making bad decisions.

It is important to know that estimates of the intrinsic value of listed companies are strongly related to the market price of their shares. It is necessary to highlight this relationship because we are carrying out a final thesis on a publicly traded company (Repsol) and the estimates of its intrinsic value will be affected according to the market price of the shares.

Business valuation, as mentioned above, establishes a series of approaches and models for estimating the intrinsic value of a company. Estimates of intrinsic value, obtained from these approaches and models, of publicly traded companies, allow us to assess whether a company's shares are undervalued, overvalued or fairly priced.

If the shares of a publicly traded company are undervalued, it means that the market price is lower than the estimated intrinsic value and, therefore, the market price is likely to increase.

If the shares of a publicly traded company are overvalued, it means that the market price is higher than the estimated intrinsic value and, therefore, the market price is likely to decrease.

If the shares of a publicly traded company are at fair value, it means that the market price is close to the estimated intrinsic value.

Thanks to these estimates, we can increase the probability of making good decisions in the stock market.

2.3.1. Models for estimating a company's intrinsic value.

The investor is a figure of great relevance when estimating the intrinsic value of a company since it is he who, from all the available information he has gathered, can make estimates, from a subjective point of view, about the wealth creation potential of

the company, the risk of achieving this wealth, and, as a result, the intrinsic value of the entity.

Estimates of a company's intrinsic value are not only established on the basis of estimates made by the investor. When calculating estimates of intrinsic value, the different approaches or more precise analytical models proposed by different economics manuals play a fundamental role, and among the established calculation models, the Discounted Cash Flow (DCF) model is one of the most common.

Before explaining this Discounted Cash Flow model in detail, let us explain the 6 principles that, according to Mercer and Harms (2008), are essential when performing a complete business valuation. These six principles are known by the acronym G.R.A.P.E.S.

-Growth and time: this principle states that, when carrying out a complete business valuation, all the factors that affect or may affect the growth of the company (both in microeconomic and macroeconomic terms), and its evolution over time, must be taken into account.

-Risk/Reward: this second principle establishes that the investor, in order to make a complete business value, must take into account the risk-return ratio, where in order to achieve a higher return, the risk to which he submits himself is greater, and this ratio has a great influence when making decisions.

-Alternative investments: there are many available investments that can be made, but there are also many ways of valuing the same investment.

-Present value: this fourth principle explains that all investments to be made at a future time have a present value and, thanks to this present value, there is the possibility of comparing future investments and observing the feasibility of the latter.

-Expectations: the present value of investments is a function of the expected future values of the selected variables.

-Sanity, rationality and consistency: the last principle teaches that the investor, based on all the information he has collected, must draw rational, prudent conclusions in accordance with the information available to him.

Having explained the 6 principles outlined by Mercer and Harms (2008), we will now present the discounted cash flow model.

2.3.1.1. Discounted Cash Flow Model.

There are many models for calculating the intrinsic value of a company, but one of the most common and most studied in universities, as well as in economics textbooks, is the discounted cash flow valuation model.

This valuation model establishes that the value of a company is determined by the cash flows that the company generates in the future, and, once these cash flows are obtained in the future, they are discounted to their present value.

The DCF model consists of using different assumptions such as costs, growth rates, income, tax rates, working capital requirements and capital expenditures, and, with them, projecting the future cash flow. Once this future cash flow has been projected, it is discounted to its present value by applying a discount rate, which reflects the risk of the investment.

In this Discounted Cash Flow model, we find some limitations that can cause a number of drawbacks to determine reasonable forecasts about future cash flows. Not only is this the problem that we find in this method, but we are also faced with the difficulty of accurately determining the discount rate to calculate the present value. In order to try to reduce these forecasts as much as possible, the operations carried out are based on the organization's historical data, profitability history, projections carried out by the entity itself, calculations made by research analysts, data from the sector in which the company operates, macroeconomic data and common sense.

DCF is one of the solutions provided, nowadays, to the problem that exists to know and evaluate an organization before making any type of negotiation or investment in the latter.

Figure 3: Discounted Cash Flow Model.

$$V_0 = \frac{FP_1}{1+r} + \dots + \frac{FP_T}{(1+r)^T} + \frac{FP_{T+1}}{r-g}\frac{1}{(1+r)^T}$$

Source: Barrachina (2022).

In Figure 3, V0 is the present value, FP represents the forecasts of one of the forms of payments that provide wealth creation for the firm (such as dividends, free cash flows or earnings) at each time period (1, 2, 3… T, where T is the last time period) over the life of the firm, r is the discount rate, and, g is the long-term growth rate. It should be

noted that the company reaches maturity in period T and enters a steady state of constant growth.

The first part of the formula (FP1/(1+r) +…+ FPT/(1+r) T), which takes the sum of the FPs at any point in time, is the present value of the interim cash flows (PVICF).

The second part of the formula ((FPT x 1/(r-g)) x (1/(1+r) T)) gives the present value of the terminal value (PVTV). In this second part of the formula, FPTx1/(r-g) captures the value in T of all the payments generated by the firm as of T, assuming that the firm (which was entered its maturity stage) and the payments it generates grow steadily at the rate g over an infinite time horizon.

In this formula for calculating the present value or intrinsic value of an entity, it is very important that the discount rate, r, be higher than the long-term growth rate, g. If r is no higher than g, the present value calculation requires greater operational complexity.

2.4. Objectives.

This Final Degree Project deals with the business valuation of the multinational oil company Repsol.

The objective of this business valuation is to determine the current or present value of the company through the use of the Discounted Cash Flows method.

It also aims, through the application of different tools, to study its accounting information.

Another objective is to identify Repsol's weaknesses, threats, strengths and opportunities, that is to say, to carry out a SWOT analysis of the organization under study.

3. Methodology.

Before starting with the analysis of the Repsol data, I will first briefly explain the methods or formulas that will be used throughout the analysis, as well as the meaning of each one of them and the information provided by the results of the latter.

The methods or formulas to be used are as follows: Piotroski F-Score, Stock exchange ratios, Weighted Average Cost of Capital (WACC), Free Cash Flow and Forecasted Free Cash Flow.

3.1. Piotroski F-Score.

Accounting professor Joseph Piotroski was the creator, in 2000, of the Piotroski F-Score, a financial indicator created with the aim of being able to assess, based on 9

criteria, the financial soundness of an entity taking into account a series of determining factors such as profitability, leverage, liquidity, source of funds criteria and operating efficiency criteria.

According to Piotroski, on the one hand, if companies score 8 or 9 points, they show high financial strength, but, on the other hand, if entities score less than 3 points, it means that these companies have little or no financial strength and are therefore financially week.

This score is acquired in the following way: if the company complies with the formulation of the criterion, the company obtains one point, but, on the contrary, if the company does not comply with the approach of the criterion, the company obtains 0 points. This is how the 9 variables are evaluated and, at the end, the points obtained by the company in each criterion or variable are added up to determine its financial soundness. Therefore, the minimum score the company can obtain is 0 and the maximum score is 9.

The following image shows the Piotroski F-Score formula:

Figure 4: Piotroski F-Score Formula.

$$F\_SCORE = F\_ROA + F\_\Delta ROA + F\_CFO + F\_ACCRUAL + F\_\Delta MARGIN$$
$$+ F\_\Delta TURN + F\_\Delta LEVER + F\_\Delta LIQUID + EQ\_OFFER.$$

Source: Zonavalue.com

Now, let's see, in detail, what each of the variables established in the formula mean:

➢ F-SCORE: is the sum of the points obtained by the company in each variable, which allows us to determine the financial soundness of the entity.

➢ F-ROA: determines if the company shows a positive ROA in the current year, and, if so, the company will obtain 1 point in this variable, and, on the contrary, if this year's ROA is not positive, the company will have 0 points.

➢ F-ΔROA: this variable gives 1 point to the company if this year's ROA is higher than last year's ROA, but if it is not higher, the company will have 0 points in this indicator.

- ➤ F-CFO: gives the company one point if the current year's Operating Cash Flow is positive, and, conversely, gives 0 points if the Operating Cash Flow is not positive.

- ➤ F-ACCRUAL: the company obtains one point in this variable if its Operating Cash Flows for this year is greater than the net profit it has obtained, but if it is not greater, it will obtain 0 points in its F-ACCRUAL.

- ➤ F-ΔMARGIN: this indicator focuses on the entity's gross margin, and awards 1 point to the company if this year's gross margin is higher than last year's gross margin, and 0 points if it is not higher.

- ➤ F-ΔTURN: this variable reflects asset turnover. Therefore, if the current year's asset turnover is higher than last year's, the company gets 1 point, and, on the contrary, if it is not higher, the company does not get any point.

- ➤ F-ΔLEVER: this indicator tries to determine that this year's long-term debt is lower than last year´s, and, if this is met, the company will get one point, but, if it is not met, the company will get 0 points.

- ➤ F-ΔLIQUID: determines whether this year's current ratio is higher than last year's current ratio, and, if this is met, the company acquires one point, but, if this condition is not met, the company will have 0 points in this variable.

- ➤ EQ-OFFER: gives 1 point to the entity if it has not issued new shares to the public in the last year, without capital increases, and gives 0 points to the company if it has issued new shares.

These indicators of the F-SCORE formula proposed by Piotroski are grouped according to the conditions mentioned above, in the first paragraph of this section entitled "Piotroski F-Score".

The indicators related to the company's profitability are as follows: F-ROA, F-ΔROA, F-CFO and F-ACCRUAL.

The indicators related to the company's leverage, liquidity and source of funds criteria are as follows: F-ΔLEVER, F-ΔLIQUID and EQ-OFFER.

The indicators related to the entity's operating efficiency are as follows: F-ΔMARGIN and F-ΔTURN.

All the indicators mentioned above are calculated from the accounting information provided in the company's annual accounts, but some of these indicators require the use or analysis of some variables that cannot be extracted directly from the annual accounts, and as regards these variables, a series of calculations must be made to obtain them.

These variables are as follows:

- ROA: to calculate this variable, the following formula is applied.

Figure 5: Return on Assets (ROA) Formula.

Return on Assets (ROA)

$$\text{Return on Assets} = \frac{\text{Operating income}}{\text{Total assets}}$$

Source: Brown, M. (27 September 2022).

- OCF: to calculate this variable, the following formula is applied.

Figure 6: Operating Cash Flow (OCF) Formula.

By definition, **Operating Cash Flow (OCF)** is:

$$\text{OCF} = \text{EBIT} + \text{Depreciation} - \text{Taxes}$$

Source: figure extracted from a YouTube video. Teach me finance (12 Oct. 2019).

- Gross Margin: to calculate this variable, the following formula is applied.

Figure 7: Gross Margin Ratio Formula.

$$\text{Gross Margin Ratio} = \frac{\text{Total Revenue} - \text{Cost of Goods Sold}}{\text{Total Revenue}}$$

Source: CFI Team (25 March 2020).

- Current Ratio: to calculate this variable, the following formula is applied.

Figure 8: Current Ratio Formula.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Source: WallStreetPrep. (w.d.).

- Leverage: to calculate this variable, the following formula is applied.

Figure 9: Financial Leverage Ratio.

$$\text{Financial Leverage} = \frac{\text{Total Debt}}{\text{Shareholders' Equity}}$$

Source: Barrachina (2022).

- Assets Turnover Ratio: to calculate this variable, the following formula is applied.

Figure 10: Asset Turnover Ratio Formula.

$$\text{Asset Turnover Ratio Formula} = \frac{\text{Net Sales}}{\text{Average Total Assets}}$$

3.2. Stock exchange ratios.

Stock exchange ratios are financial indicators that show, on the one hand, the financial situation of an entity and, on the other hand, allow the business valuation of a listed entity to be carried out.

The main purpose of these ratios, generally, is to inform about the company's stock price, that is to say, to provide information that determines whether the company is trading at a good price or not. In addition to this objective, these ratios can also be used to determine a company's indebtedness or liquidity.

It is very important to bear in mind that these stock exchange ratios do not provide us with all the information necessary to make a complete business valuation.

These ratios simply provide information about a part of the company's financial analysis, but it is very important that this financial analysis is completed through a competitive analysis (such as the elaboration of a SWOT or the identification of the company's competitive advantages) in order to be able to determine, as much as possible, the intrinsic value of an entity.

Now, let's take a look at some of the stock exchange ratios used in the financial analysis of a company:

-Price to Earnings Ratio or PER: is the most widely known and used stock exchange ratio due to its simplicity and ease of use. The PER is responsible for establishing a relationship between the market capitalization (total market value of a company) with the net profit of the entity.

The PER formula is as follows:

PER = Market Capitalization / Net Income

The PER formula can also be represented as follows:

PER = Price per share / Earnings per share

The latter formula reflects the ratio of the company's earnings per share to its price per share. This is another formula that can be used to obtain a company's PER.

Regarding the result obtained in these formulas, taking into account that the score around 15 is the historical average PER, if a share is trading with a PER greater than 15, in principle, the company's share is expensive, but if a share is trading with a PER lower than 15, the company's share is cheap.

-Price/Book Value or P/BV: is one of the most classic stock exchange ratios used for stock valuation. This ratio is the result of dividing the market capitalization by the company's shareholders' equity.

The P/BV formula is as follows:

P/BV = Market Capitalization / Shareholders' Equity

The P/BV formula can also be represented as follows:

P/BV = Price per share / Theoretical value per share

The latter formula can also be applied to the calculation of the Price/Book Value because this ratio reflects the relationship between the price per share and the underlying book value of the share.

Both formulas are valid to obtain the value of this ratio.

This ratio is usually quoted in a range between 1.5 and 2.5, so that if a company's P/BV is less than 1, it means that the company is at risk of bankruptcy.

3.3. Weighted Average Cost of Capital (WACC).

The WACC is a financial tool used to value investment projects. On the one hand, it allows companies to know their level of liquidity and helps them to make decisions in the event of unexpected situations affecting their capital, and, on the other hand, it allows investors to determine the value of an entity.

The Weighted Average Cost of Capital is the cost of two capital resources that the entity has, and these two resources are: financial debt and equity.

The following formula is used to calculate the WACC:

Figure 11: Weighted Average Cost of Capital (WACC) Formula.

$$WACC = K_e * \frac{E}{E+D} + K_d * (1-t) * \frac{D}{E+D}$$

Source: Finacoteca (w.d.).

❖ **E:** are the company's shareholder's equity.

❖ **D:** shows the company's financial debt.

❖ **t:** is the corporate income tax imposed on the company.

❖ **Kd:** is the cost of financial debt.

❖ **Ke:** is the cost of equity, also known as the return, demanded by the shareholders.

❖ **T or (1 – t):** is the tax shield.

Of all the variables explained, there are some that can be extracted directly from the company's balance sheet, such as equity (E) and financial debt (D) taking into account that this debt is extracted from the company's liabilities and we will have to remove, from these liabilities, the provisions and the trade payables because these do not represent a debt payment for the company. Thus, the financial debt formula is:

- Total Debt (D) = Total Liabilities – Commercial Creditors – Provisions

Corporate income tax is set by the State, but it can also be calculated, in case it is not available to develop a practical exercise, such as this Final Degree Project, as follows:

- t = Net Income / EBIT

Thus, t is obtained as the quotient between net income and earnings before interest and taxes.

Once the corporate income tax (t) has been obtained, to calculate the company's tax shield, simply do the following:

- T (tax shield) = (1 – t)

The value that can be obtained in the tax shield (T) van only vary between 0 and 1.

There are some variables such as the cost financial debt (Kd) or the cost of equity (Ke) that must be calculated from an intermediate process that will be explained below.

The cost of a company's financial debt (Kd) is the quotient of the following formula:

- Kd = Financial Costs / ((Debt t-1 + Debt t) / 2)

Where the financial costs are taken directly from the company's profit and loss account, and the divisor is calculated as the sum of the total debts of the previous year and the sum of the total debts of the current year (taken from the Balance Sheet), and this sum is divided by 2.

Finally, to calculate the cost of equity (Ke), the Capital Asset Pricing Model (CAPM) will be needed.

The CAPM is an analytical tool that allows the valuation of financial assets and from which estimates can be made about the rate of return of financial asset.

The CAPM establishes the relationship between the risk of investing in a financial asset and the expected return on such asset according to the risk being assumed. Therefore, the higher the investment risk, the higher the expected return, but also the higher the volatility of such asset.

In order to obtain a successful CAPM result, it is necessary to start from different assumptions:

-There is a market in equilibrium, where the supply and demand for financial assets is the same.

-Diversifiable risk not taken into account.

-There is risk aversion among investors and information transparency.

-Return on assets shows a normal distribution.

Therefore, the formula representing the expected rate of return on the asset (Ke) is as follows:

- $Ke = Rf + \beta (Rm - Rf)$

Rf: is the risk-free return on the asset (it is necessary to emphasize that all financial assets have risk, so the lowest risk is the one to be traded).

B: measures the sensitivity of the financial asset's yield to a change in the market yield, so that the higher the beta, the greater the risk. It is important to bear in mind that:

- ➢ If β is greater than 1, the asset has a higher sensitivity, so it will go up and down more than the market.
- ➢ If β is less than 1, the asset has lower sensitivity, so it will go up and down less than the market.
- ➢ If β is equal to 1, the financial asset goes up and down just like the market.

Rm: is the expected rate of return of the market in which the financial asset is listed.

(Rm – Rf): this difference refers to the risk associated with the market on which the financial asset is listed.

3.4. Free Cash Flow (FCF).

A company's free cash flows show how much liquidity a company has, excluding the cash outflows the company incurs as a result of carrying out its activity (operating

expenses and capital expenditures). In other words, free cash flows are analytical tools that determine the financial value of an entity.

The calculation of cash flow is very important because it determines the amount of money that goes to pay shareholders and creditors, as well as providing information about how much money can be allocated to the company's future investments.

The higher an entity's free cash flow, the greater its capacity to repay debt and the greater its capacity to make investments that will allow it to grow.

There are three possible methods for calculating a company's free cash flow: sales revenue, operating cash flow, and net operating profit. Each company will use one of the three possible methods depending on which one best suits its business, but the end result with any of the three methods should be the same.

The following formulas provided by Corporate Finance Institute will be used to calculate the free cash flow for this project:

Free Cash Flow = Cash Flow from Operating Activities – Capex - Intex

Where:

Cash Flow from Operating Activities = Net Income + Depreciation & Amortization + Corporate Tax + Financial Expenses - Treasury

Where:

Capex = Property, Plant & Equipment$_t$ - Property, Plant & Equipment$_{t-1}$

Where:

Intex = Intangible Assets$_t$ - Intangible Assets$_{t-1}$

3.5. Forecasted Free Cash Flow.

Free cash flow forecasting is an indispensable tool for the application of the discounted cash flow model (DCF) because in order to calculate the intrinsic value of a company it is necessary to estimate future free cash flows. The approach applied and assumptions made to forecast Free Cash Flows are explained below.

4. Financial analysis of Repsol S.A.

This section of this final degree project will consist of the application of the formulas explained above to the annual accounts of Repsol, the subsequent analysis of these formulas and the analysis of the possible future results of this company.

The following methods will be applied to show Repsol's economic-financial situation:

1. Piotroski F-Score.

2. Stock exchange ratios.

3. Weighted Average Cost of Capital (WACC).

4. Free Cash Flow, Intrinsic Value and Forecasted Free Cash Flow.

4.1. Piotroski F-Score.

According to this indicator, the assessment of Repsol's financial strength over the last 5 years is as follows:

Table 4: Repsol's Piotroski F-Score, 2017-2021.

	2021	2020	2019	2018	2017
ROA (%) > 0	1	1	1	1	1
Cash Flow > 0	1	0	0	1	1
Δ ROA (%) > 0	1	0	1	1	1
Cash Flow > Op. Income - Extraordinary Income	1	1	1	1	1
$Leverage_t < Leverage_{t-1}$	0	0	0	1	1
$Current\ Ratio_t > Current\ Ratio_{t-1}$	1	1	0	1	1
$N^o\ Shares_t \leq N^o\ Shares_{t-1}$	1	1	1	1	0
$Gross\ Margin_t > Gross\ Margin_{t-1}$	1	0	0	0	1
$Assut\ Turnover_t > Asset\ turnover_{t-1}$	1	0	1	1	1
TOTAL PIOTROSKI F-SCORE	**8**	**4**	**5**	**8**	**8**

Source: own elaboration, based on Repsol's economic data, provided by SABI.

Table 5: Summary table of the data needed to make the Repsol's Piotroski F-Score.

		2021	2020	2019	2018	2017
PROFITABILITY	ROA (%)	91%	70%	86%	84%	71%
	Cash Flow	4532	-1113	-1355	4499	4560
	Δ ROA (%)	31,49%	-19,61%	3,14%	18,40%	28,68%
	Op. Income - Extraordinary Income	2528	-3320	-3789	1947	2161
FINANCIAL PERFORMANCE	Leverage (%)	1,47	1,40	1,30	0,97	0,99
	Current ratio	1,30	1,29	1,09	1,35	1,23
	Shares outstanding	1.527.396.053	1.527.396.053	1.527.396.053	1.527.396.053	1.527.396.053
OPERATIVE EFFICIENCY	Gross margin (%)	7,31%	-7,45%	-6,50%	4,81%	6,58%
	Asset Turonver	0,94	0,62	0,83	0,83	0,67

Source: own elaboration, based on Repsol's economic data, provided by SABI.

The first four indicators in the table 4 (*"Repsol's Piotroski F-Score, 2017-2021"*) refer to the company's profitability. In the first of the indicators (ROA > 0), the company has obtained, during the last five years under study, one point in each of them, as far as this indicator is concerned, the return on assets has been positive during this 5-year period, and, not only has it been positive, but it has also been very high (see in *"Table 5: Summary table of the data needed to make the Repsol's Piotroski F-Score"*), that is,

the company is able to generate a high profit in relation to the assets that are present in its balance sheet. The second indicator (Cash Flow > 0), collects a greater diversity of results, since there are three years (2017, 2018, 2021) where the company obtained 1 point, but in the other two years (2019, 2020) remaining the company obtained 0 points, so, according to these results, we can conclude that the company has obtained a greater cash inflow than cash outflow in three of the five years that have been studied. In the third indicator (Δ ROA > 0), Repsol has obtained 1 point in four (2017, 2018, 2019, 2021) of the five years studied, and, this shows that the company, was obtaining an increase in its return on assets from year 2017 to year 2019, which decreased in year 2020, possibly because of the great world crisis derived from the Covid-19, but the company managed to rebuild itself in year 2021 increasing again the ROA up to 31,49% (see the percentages of the variations in *"Table 5: Summary table of the data needed to make the Repsol's Piotroski F-Score"*). In the fourth and last indicator (Cash Flow > Op. Income – Extraordinary Income), Repsol has shown that in the last five years, it has always obtained an annual Cash Flow higher than the net profit of the year studied. To conclude with this profitability section, it is worth noting that Repsol has obtained the maximum possible points (4) in this section of the analysis in 2017, 2018 and 2021.

The following 3 indicators in table 4 (*"Repsol´s Piotroski F-Score, 2017-2021"*) reflect an analysis of Repsol´s financial performance. In the first of the three indicators (Leverage$_t$ < Leverage$_{t-1}$), Repsol has not obtained generally good results, because only in two (2017, 2018) of the five years it has obtained 1 point, that is, from 2019 to 2021 Repsol has been increasing its leverage annually (see results in *"Table 5: Summary table of the data needed to make the Repsol's Piotroski F-Score"*). In the second indicator (Current Ratio$_t$ > Current Ratio$_{t-1}$), Repsol shows good results because in four of the five years, with the exception of 2019, current assets have been growing from one year to another (see percentages in *"Table 5: Summary table of the data needed to make the Repsol's Piotroski F-Score"*) so that, from one year to another, the company has been increasing its capacity to meet the payment of its debts with short-term maturity, emphasizing, again, 20119 as an exception to this explanation. In the third and last indicator referring to the financial results of the entity, the company has obtained 1 point from the year 2018 to the year 2021 because in these four years, as can be seen in table 5 (*"Summary table of the data needed to make the Repsol's Piotroski F-Score"*), Repsol has issued the same number of shares, but, in the year 2017 Repsol has 0 points in this indicator because in 2017 Repsol made a capital increase and issued more shares than in 2016 (1.465.644.100 shares

issued). To conclude with this section related to the company's financial results, only in 2018 did Repsol obtain the maximum possible sum of points (3 points).

The last two indicators of the Piotroski F-Score analysis are focused on Repsol's operating efficiency. In the first of the two indicators (Gross Margin$_t$ > Gross Margin$_{t-1}$), Repsol only gets 1 point in the years 2017 and 2021, which is somewhat alarming because this means that during the period 2018-2020, Repsol's gross margins have been decreasing year after year, but from year 2020 to year 2021 Repsol increased its gross margin (see the percentage variations in *"Table 5: Summary table of the data needed to make the Repsol's Piotroski F-Score"*) so it seems to be, that after the negative decrease of the gross margin during the period 2018-2020, Repsol has known how to act and increase this margin. In the second and last indicator (Asset Turnover$_t$ > Asset Turonver$_{t-1}$) of said section, Repsol obtains quite favorable results, since, it obtains 1 point in four of the five years under analysis, being 2020 the exception, possibly because of Covid-19, therefore, during the period 2017-2019 and from year 2020 to year 2021, the company has efficiently used its assets to generate income (see data in *"Table 5: Summary table of the data needed to make the Repsol's Piotroski F-Score"*). To conclude with the analysis of the company´s operating efficiency, it can be stated, frankly, that Repsol has been operating efficiently in 2017 and 2021, because these are the only years, of the five studied, in which Repsol achieves two points out of a possible two.

To finish this Piotroski F-Score analysis, the overall conclusion of the numerical results obtained, allows us to state that Repsol, in 2017 showed a score of 8 out of 9 so that its financial strength was very high, maintaining the latter in 2018 at the same score. In 2019, the company reduces its score by 3 points, so that, with 5 points in this analysis, the company reflected a normal financial strength. In 2020 this score continued to fall, reaching 4 points out of a possible 9, and therefore Repsol showed that its financial strength began to fall into the medium-bad range. Finally, from 2020 to 2021 is when there was a sharp increase in this score by 4 units, thus reaching 8 points out of 9 and showing a financial strength, again, very high (see the scores in *"Table 4: Repsol´s Piotroski F-Score, 2017-2021"*).

4.2. Stock exchange ratios.

The following method of stock exchange ratios will show the company's stock market price and its financial situation, so that this analysis will allow us to know Repsol's situation in the stock market to determine whether the company has a good stock market price or not.

The following table shows a summary of a Repsol's results in the ratios studied, which will be explained later:

Table 6: Repsol's results of PER and P/BV ratios, 2017-2021.

	2021	2020	2019	2018	2017
EPS	1,655	-2,174	-2,481	1,544	1,415
Price at the end of the year	10,44	8,25	13,93	14,08	14,75
PER	6,308	-3,795	-5,615	9,116	10,425
Book Value	14,923	13,447	16,505	20,240	19,683
Price/Book Value	0,700	0,614	0,844	0,696	0,749
Dividends	898.108.879,16	1.399.094.784,55	1.399.094.784,55	1.333.416.754,27	1.162.348.396,33

Source: own elaboration, based on Repsol's economic data, provided by SABI and Repsol.com.

Table 7: Additional data for the calculation of the ratios, 2016-2021.

	2021	2020	2019	2018	2017	2016
Net Income	2528	-3320	-3789	2359	2161	1779
Net Income*1.000.000	2.528.000.000,00	-3.320.000.000,00	-3.789.000.000,00	2.359.000.000,00	2.161.000.000,00	1.779.000.000,00
Shares	1.527.396.053	1.527.396.053	1.527.396.053	1.527.396.053	1.527.396.053	1.465.644.100
EPS	1,655	-2,174	-2,481	1,544	1,415	1,214
Price at end of the year	10,44	8,25	13,93	14,08	14,75	13,42
PER	6,308	-3,795	-5,615	9,116	10,425	11,056
Shareholders' equity	22.794	20.539	25.209	30.914	30.063	31.115
Shareholders' equity*1.000.000	22.794.000.000	20.539.000.000	25.209.000.000	30.914.000.000	30.063.000.000	31.115.000.000
Shares	1.527.396.053	1.527.396.053	1.527.396.053	1.527.396.053	1.527.396.053	1.465.644.100
Book Value	14,923	13,447	16,505	20,240	19,683	21,230
Price/Book Value	0,700	0,614	0,844	0,696	0,749	0,632

Source: own elaboration, based on Repsol's economic data, provided by SABI and Repsol.com.

Table 8: Data on Repsol' share price and dividend payments, 2016-2021.

	2021	2020	2019	2018	2017	2016
Dividends	0,588 €/share	0,916 €/share	0,916 €/share	0,873 €/share	0,761 €/share	0,758 €/share
Payment of dividends	898.108.879,16	1.399.094.784,55	1.399.094.784,55	1.333.416.754,27	1.162.348.396,33	1.110.958.227,80

Source: own elaboration, based on Repsol's economic data, provided by Repsol.com.

As can be seen in table 6 (*"Repsol's results of PER and P/BV ratios, 2017-2021"*), Repsol's results regarding earnings per share (EPS) in the first two years under study (2017, 2018) are frankly good, since, during this period, the company obtained a high net profit. Subsequently, in the years 2019 and 2020, the earnings per share (EPS) suffer a sharp fall until incurring negative numbers, and, the cause of this, as can be seen in table 7 (*"Additional data for the calculation of the ratios, 2016-2021"*), lies in the fall of the entity's net profit until reaching negative numbers, without having any responsibility, in these negative results, the number of shares, because this is constant

during the period 2017-2021. Finally, in the year 2021, these earnings per share (EPS) become positive again after a good business and financial management of the company itself, which increases its net profit by large amounts until reaching a positive number in its net profit.

Regarding the PER, taking into account, on the one hand, that the historical average PER is around 15 (as mentioned earlier in this final degree project), and, on the other hand, that, during the period studied (2017-2021) in none of the cases a PER higher than 15 is shown (see data in *"Table 6: Repsol's results of PER and P/BV ratios, 2017-2021"*), it can be stated that the company's shares, in any of the five years studied, have a cheap price, so it is advisable to be able to invest in them to subsequently sell them and make such investment profitable.

The book value of the company, follows a pattern of behavior very similar to the share price (see table 6:*"Repsol's results of PER and P/BV ratios, 2017-2021"*), where in 2017 and 2018 it shows similar values, but in 2019 it begins to fall, reaching the lowest value (of the five years studied) in 2020, and then increases again in book value in 2021, thus reflecting an improvement in the economic-financial situation of Repsol.

Once we have seen the book value and the share prices, it is possible to calculate the price/book value ratio (P/BV) and, in accordance with, on the one hand, the results obtained in this ratio (see the results in *"Table 6: Repsol's results of PER and P/BV ratios, 2017-2021"*), and, on the other hand, that this ratio is quoted in a range between 1,5 and 2,5 points, usually, a priori, and based solely on this ratio without taking into account other financial analysis, it could be stated that, in these years studied, Repsol could have incurred a possible risk of bankruptcy.

Finally, and, to conclude this ratio analysis, additional information has been provided regarding the entity's dividends, where it can be observed, in table 8 (*"Data on Repsol's share price and dividend payments, 2016-2021"*) the dividends per share and the payment of total dividends according to the number of shares (see the latter in *"Table 7: Additional data for the calculation of the ratios, 2016-2021"*).

4.3. Weighted Average Cost of Capital (WACC).

Before calculating the intrinsic value and the free cash flow forecast, it will be necessary to calculate the Weighted Average Cost of Capital (WACC) and, once this WACC has been obtained in each of the years studied, an average of all the WACCs obtained in each year will be taken to obtain the average of the Weighted Average Cost of Capital (r), which is necessary to obtain the intrinsic value and the free cash flow forecast.

The following table reflects the operations performed for the calculation of the WACC and the average WACC:

Table 9: Repsol's weighted average cost of capital calculation.

	2021	2020	2019	2018	2017	2016
SE/D+SE	48,05%	47,48%	50,07%	58,55%	57,49%	54,98%
D/D+SE	51,95%	52,52%	49,93%	41,45%	42,51%	45,02%
Rf	0,0124					
Rm	0,0793					
Beta	0,78	0,78	0,78	0,78	0,78	0,78
Ke	0,064582	0,064582	0,064582	0,064582	0,064582	0,064582
Kd	0,023602	0,032849	0,031860	0,046113	0,028969	0,028372
Kd*(1-Tax Rate)	0,013783	0,032849	0,031860	0,026937	0,018516	0,022443
WACC	0,038190	0,047915	0,048245	0,048980	0,045001	0,045611
Average WACC	0,045657					

Source: own elaboration, based on Repsol's economic data, provided by SABI, InfrontAnalytics.com, Bank of Spain's Website, and BolsasyMercados.com.

The risk-free asset return (Rf) is provided by the Bank of Spain's website and refers to the annual return on 30-year Spanish government bonds in 2021.

The expected rate of return of the stock market (Rm) is provided by the IBEX 35 and refers to the annual return of the IBEX 35 in 2021.

Beta (β) is provided by Infront Analytics (see website link in the bibliography of the project) and refers to Repsol's annual beta, which will be considered constant from 2016 to 2021.

The Average WACC is calculated as the average WACC from 2016 to 2021, and this will be the value used in the calculations of the company's intrinsic value and free cash flow forecasts.

Once the average WACC has been obtained, it is not yet possible to obtain the intrinsic value or the forecast of free cash flows, because, in order to obtain these two values, the growth rate (g) will also be necessary. The constant rate at which the company and its cash flows are assumed to grow annually over an infinite time horizon starting in 2024 (g), has been assumed to be equal to the historical average annual rate of change of Spanish GDP per capita over the period 2017-2021.

The following table reflects the operations necessary to obtain Repsol's growth rate:

Table 10: Repsol's growth rate calculation.

GDPpc	25.500	23.610	26.440	25.760	24.980	23.990
Var. GDPpc	8,01%	-10,70%	2,64%	3,12%	4,13%	
Average Var. GDPpc	0,0144					

4.4. Repsol's intrinsic value and forecasted free cash flow.

The following table reflects the company's 2017-2021 Free Cash Flows applying the formula explained above specifying the value of the accounting item that constitute them:

Table 11: Repsol's Free Cash Flow, 2017-2021.

	2021	2020	2019	2018	2017
Net Income	2528	-3320	-3789	2359	2161
Depreciation and amortization	2004	2207	2434	2140	2399
Corporate income tax	1801	16	588	1386	1220
Financial expenses	559	786	749	1017	691
Treasury	5595	4321	2979	4786	4601
Op. Cash Flow	1297	-4632	-2997	2116	1870
CapEx	799	-2218	-2286	831	-2697
IntEx	144	-1117	-626	512	-452
Free Cash Flow	354	-1297	-85	773	5019
Free Cash Flow*1.000.000	354.000.000	-1.297.000.000	-85.000.000	773.000.000	5.019.000.000

Source: own elaboration, based on Repsol's economic data, provided by SABI.

As can be seen in the table above, Repsol presents positive free cash flows in three of the five years studied (2017, 2018, 2021). On the one hand, these results are very good since the entity is obtaining money to be able to invest it in the maintenance and growth of this, but, on the other hand, it is alarming the sharp drop that occurs in these free cash flows from 2018 to 2020 (as has already been observed in other tables explained above), pointing to Covid-19 as the main cause of these falls. However, it is also necessary to emphasize how the company was able to recover from this major crisis and once again achieve positive free cash flows in 2021 with a strong growth in its operating cash flows, although this growth is affected by a heavy investment in tangible and intangible fixed assets and causes a decrease in free cash flows in 2021, which remain positive.

Finally, to conclude with the calculations necessary to obtain the intrinsic value and the forecast of free cash flows, the following table reflects the forecasting of the accounting items constituting Free Cash Flows and the forecasting of Free Cash Flows themselves:

Table 12: Repsol's Forecasted Free Cash Flows, 2022-2025.

	Variations	2022	2023	2024	2025
Net Income	-0,1573	2.130,26	1.795,09	1.512,66	1.534,42
Depreciation and amortization	-0,0328	1.938,22	1.874,59	1.813,06	1.839,13
Corporate income tax	-0,1573	1.517,64	1.278,86	1.077,65	1.093,15
Financial expenses	-0,0005	558,75	558,49	558,24	566,26
Treasury	-0,1573	4.714,71	3.972,92	3.347,84	3.395,99
Op. Cash Flow		1.430,15	1.534,12	1.613,77	1.636,98
Property, plant and equipment	-0,0284	21.108,11	20.507,80	19.924,55	20.211,09
Intangible assets	-0,0545	3.306,33	3.126,06	2.955,62	2.998,13
Capex		-617,89	-600,32	-583,24	286,54
Intex		-190,67	-180,27	-170,44	42,51
Free Cash Flow		2.238,70	2.314,70	2.367,45	1.307,93
FCF*1.000.000		2.238.702.268,03	2.314.703.512,07	2.367.451.672,90	1.307.933.157,33

Source: own elaboration, based on Repsol's economic data, provided by SABI.

Table 13: Supplementary information to the calculation of the variations in table 12.

	2021	2020	2019	2018	2017	Average of variations
Average debt	23684	23928	23509	22055	23853	
Variations in average debt	-0,0102	0,0178	0,0660	-0,0754		-0,0005
Intangible assets + Prop. Plant & Eq.	25223	24280	27615	30527	29184	
Variations in Int. Assets and Prop. Plant & Eq.	0,0388	-0,1208	-0,0954	0,0460		-0,0328

Source: own elaboration, based on Repsol's economic data, provided by SABI.

As mentioned above, table 12 shows the forecast of free cash flows (in millions of euros) for the period 2022-2024, which have been calculated based on the forecasts of their accounting elements. The annual relative variation for each of these accounting elements assumed for each year in the future will be explained below:

- Variation in Net Income: assumed to be the historical annual average rate of variation of net income during 2017-2021.

- Variation in depreciation and amortization: assumed to be the historical annual average rate of variation of fixed assets, both tangible and intangible (see data in: *"Table 13: Supplementary information to the calculation of the variations in table 12"*), during 2017-2021.

- Variation in corporate income tax: it has been necessary to assume, due to analytical inconveniences, that it is the same as the rate of change of net income.

- Variation in financial expenses: assumed to be the historical annual average rate of variation of average debt in two consecutive years (see data in *"Table 13: Supplementary information to the calculation of the variations in table 12"*), during 2017-2021.

- Variation in treasury: it has been assumed that it is equal to the rate of change of net income due to inconveniencies in data.

- Variation in property, plant, and equipment: assumed to be the historical annual average rate of variation of property, plant, and equipment during 2017-2021.

- Variation in intangibles assets: assumed to be the historical annual average rate of variation of intangible assets during 2017-2021.

Once the calculations of the variations have been explained, they will be used for the prediction during period 2022-2024 of the accounting items shown in Table 12 constituting Free Cash Flows.

With respect to the forecasts of these accounting items for the last year (2025), they have been obtained considering that they will grow at the rate g explained before.

In the forecast of the company's free cash flows during the period 2022-2024, it can be seen how these are increasing from one year to another, and this is due, on the one hand, to the increase from 2022 to 2024 in operating cash flows, and, on the other hand, to the decrease in the investment in Repsol's property, plant, and equipment, as well as in its intangible assets. Finally, in the year 2025, operating cash flows continue to grow, but free cash flows decrease by almost 50% as a result of a large increase in investment in P, P, & E and intangible assets, since, being the last year under study, all accounting items (including P, P, & E and intangible assets) are considered to vary at the growth rate (g) and not at the variation rate, and this is the main cause of the fall in free cash flows in 2025 (see data in *"Table 12: Repsol's Forecasted Free Cash Flows, 2022-2025"*).

To sum up this analytical explanation of Repsol's economic-financial situation, I will propose different scenarios in which the company could incur throughout the development of its activity, taking into account the evolution of the economy, in order to observe the intrinsic value that the company could have in each of the scenarios.

Table 14: Repsol's intrinsic value in scenario 1.

SCENARIO 1	2021	2022	2023	2024	2025
Forecasted Free Cash Flows		2.238.702.268,03	2.314.703.512,07	2.367.451.672,90	1.307.933.157,33
Discount Rate (r)	0,0457				
Growth Perpetuity Rate (g)	0,0144				
Terminal Free Cash Flow	Terminal FCF = $FCF_{2025}/(k-g)$				41.807.144.181,83
Discounted Free Cash Flow		2.140.934.228,58	2.116.943.871,25	2.070.627.995,31	36.565.495.354,37
Firm's Value	42.894.001.449,52				
Number of shares outstanding	1.527.396.053,00				
Intrinsic Value of a share	28,08				

Source: own elaboration.

In this first scenario, the intrinsic value obtained from the company, as well as the intrinsic value of a share of an entity, have been obtained from the use of the WACC, and the growth rate (g) previously calculated.

Table 15: Repsol's intrinsic value in scenario 2.

SCENARIO 2	2021	2022	2023	2024	2025
Forecasted Free Cash Flows		2.238.702.268,03	2.314.703.512,07	2.367.451.672,90	1.307.933.157,33
Discount Rate (r)	0,0457				
Growth Perpetuity Rate (g)	0				
Terminal Free Cash Flow	Terminal FCF = $FCF_{2025}/(k-g)$				28.619.981.560,74
Discounted Free Cash Flow		2.140.864.749,00	2.116.806.471,43	2.070.426.408,04	25.029.260.913,51
Firm's Value	31.357.358.541,99				
Number of shares outstanding	1.527.396.053,00				
Intrinsic Value of a share	20,53				

Source: own elaboration.

This second scenario will be worked under two hypotheses (where one of the hypotheses will reflect a certain pessimism): the first is that the WACC, which will be used to calculate the intrinsic value of the entity and the intrinsic value of a share, will be the same as in scenario 1 (this is, the one obtained from Repsol's accounting results); and the second hypothesis is that the long-run growth rate of the company, affected by a negative economic situation, is equal to 0.

Table 16: Repsol's intrinsic value in scenario 3.

SCENARIO 3	2021	2022	2023	2024	2025
Forecasted Free Cash Flows		2.238.702.268,03	2.314.703.512,07	2.367.451.672,90	1.307.933.157,33
Discount Rate (r)	0,0850				
Growth Perpetuity Rate (g)	0,0144				
Terminal Free Cash Flow	Terminal FCF = $FCF_{2025}/(k-g)$				18.525.965.401,21
Discounted Free Cash Flow		2.063.320.062,70	1.966.237.135,69	1.853.497.087,35	14.504.128.343,86
Firm's Value	20.387.182.629,61				
Number of shares outstanding	1.527.396.053,00				
Intrinsic Value of a share	13,35				

Source: own elaboration.

The third scenario has been elaborated assuming, on the one hand, that the entity incurs a negative situation for it, in which its WACC will increase to r = 8,5%, this is, almost four percentage points more than in the current situation, and, on the other hand, the growth rate (g) shows no change with respect to the first scenario.

Table 17: Repsol's intrinsic value in scenario 4.

	2021	2022	2023	2024	2025
SCENARIO 4					
Forecasted Free Cash Flows		2.238.702.268,03	2.314.703.512,07	2.367.451.672,90	1.307.933.157,33
Discount Rate (r)	0,0850				
Growth Perpetuity Rate (g)	0				
Terminal Free Cash Flow	Terminal FCF = FCF$_{2025}$/(k-g)				15.387.448.909,71
Disocunted Free Cash Flow		2.063.320.062,70	1.966.237.135,69	1.853.497.087,35	12.046.958.365,60
Firm's Value	17.930.012.651,35				
Number of shares outstanding	1.527.396.053,00				
Intrinsic Value of a share	11,74				

Source: own elaboration.

The fourth and last scenario to be considered in this project is the most pessimistic possible scenario, where, on the one hand, the company's WACC will be the same as in scenario 3 (r = 8,5%), and, on the other hand, it will be assumed that the growth rate will be 0, as was assumed in scenario 2.

Finally, to conclude with the economic-financial analysis and with this end-of-degree project, as can be seen in each of the scenarios, the most optimistic and favorable situation for the company is scenario 1 (which has been drawn up based on real data), the second best situation, somewhat more pessimistic than the previous one, is the one presented in the second scenario, then the third scenario is worse than the second (as the data reflect, an increase in its WACC has a greater impact on Repsol than a worsening of the Spanish economy) but somewhat better than the fourth, and finally, the fourth scenario is the worst possible scenario for Repsol because it combines the pessimistic assumptions of scenario 2 and scenario 3. With respect to the numerical data provided in the tables of the four possible scenarios, the summary is that the intrinsic value of the company would range from 17.930.012.651,35 € - 42.894.001.449,52 € and the intrinsic value per share would range from 11,74 €/share – 28,08 €/share.

5. Conclusions.

This study not only has estimated a reasonable range for the intrinsic value of the company Repsol S.A., the Spanish multinational energy and petrochemical corporation that holds a strong position in the oil industry, through the application of the Discounted Cash Flows method. It also has analyzed the current status of the company studying its accounting information and the behavior of its stocks in the market. One of the tools employed in such study was the Piotroski F-Score analysis, according to whose results Repsol shows a fairly high average financial strength in the last five years that have been studied, since, both in 2017 and 2018 it obtained 8 points out of a possible 9, but, this financial strength is somewhat affected in 2019 and 2020, mainly as a result of Covid-19, but the company, continuing with the development of its activity and applying the sources of competitive advantage that characterize the entity, among which product differentiation and brand image stand out, managed to reach those 8 points again in 2021.

With this improvement that has been observed in the results of Piotroski's analysis, it can be affirmed that, once this crisis is over and seeing how the company has been able to recover, Repsol shows a strong growth potential, which will be analyzed in greater detail later.

In addition to these positive factors, the development of the company could be negatively affected by the war between Russia and Ukraine, since, as a consequence of this, in 2022 and 2023 fuel prices have suffered a huge increase, which will certainly have a negative impact on the company's results, of which there is no information available yet.

The information provided by the stock exchange ratios (PER and P/BV) also reinforce this idea that Repsol is rebuilding after the pandemic crisis, causing an increase from 2020 to 2021.

All this crisis derived from the pandemic, and the current crisis derived from the war, have greatly affected all economic sectors (primary, secondary, and tertiary), and, of course, the oil sector has been one of the most affected, but Repsol shows a leadership position in this sector and has been able to maintain it in spite of the adversities.

In more financial terms, it can be observed that Repsol suffered a huge drop in its free cash flows from 2017 to 2020, from which it recovered, as explained throughout this section of conclusions, in 2021. The process of forecasting future cash flows and, in general, the process of valuing the company carried out in the study has been based

on the assumption that this recovery will be sustained in the future. More precisely, the future cash flows has been forecasted assuming a strong growth during the period 2022-2024 based on its historical accounting information. Subsequently, from 2025 onwards, Repsol is assumed to grow in the long-run at a constant growth rate (g), where it reaches a cash flow forecast range between 15.387.448.909, 71 € (in the worst case scenario where the growth rate (g) would be zero, and where the discount rate would have a higher value [4 percentage points more, r=8,5%] than the current value) and 41.807.144.181,83 € (operating with the discount and growth rates obtained from the historical evolution of the company's accounting data and the Spanish Gross Domestic Product per capita, respectively).

This valuation process concluded that the intrinsic value of the company would range between 17.930.012.651,35 € - 42.894.001.449,52 €, and, regarding the intrinsic value of the share, this would range between 11,74 €/share – 28,08 €/share, in such a way that, if the company is quoted in the market at a price smaller than 11,74 €/share it would be advisable to invest in it, because, according to these calculations, the price of this share would not fall any further and could only increase even until reaching 28,08 €/share.

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