CATÓLICA LISBON
BUSINESS & ECONOMICS

Apple Inc.

Equity Valuation

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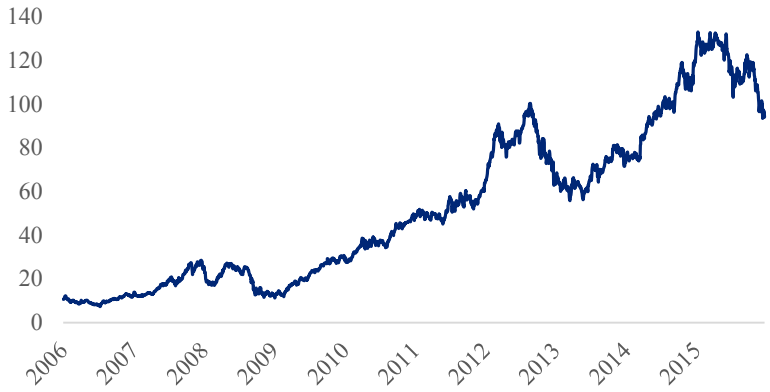
RESEARCH NOTE

SHARE VALUE

A fair value of $196 was reached for Apple Inc. In this value is reflected the company's outstanding performance over the last decade, becoming one of the most admirable and valuable firms in the world. The company has been acquiring several technology companies over the years in order to sustain its fast growing strategy and increase its products solutions. The target price represents a 65% increase in relation to the stock price of $119, as of October 28th 2015.

Exhibit 1: Apple stock price performance ($), 2006 - 2015



Source: Thomson Reuters and own analysis

APPLE VS THE MARKET

In the course of the year 2007, Apple more than doubled its share price. This can be explained by its first introduction of the iPhone, which came to revolutionize the industry and how people use their smartphones. It is now the main source of revenues for the company. As one can see from the graph below, in 2008 and 2009 Apple was affected by the financial crisis and its momentum slowed down.

AAPL.O, Apple Inc.

Recommendation:

BUY

Price: $196,41

March 23rd 2016, Portugal

Company's Data

Share price on 28-Oct-2015: $119,27

Shares outstanding: 5,54B

Valuation Target

Date: 28-Oct-2015

EV: $1.096B

Equity: $947,9B

Shares outstanding: 5,54B

Price target: $196,41

Goldman Sachs Valuation

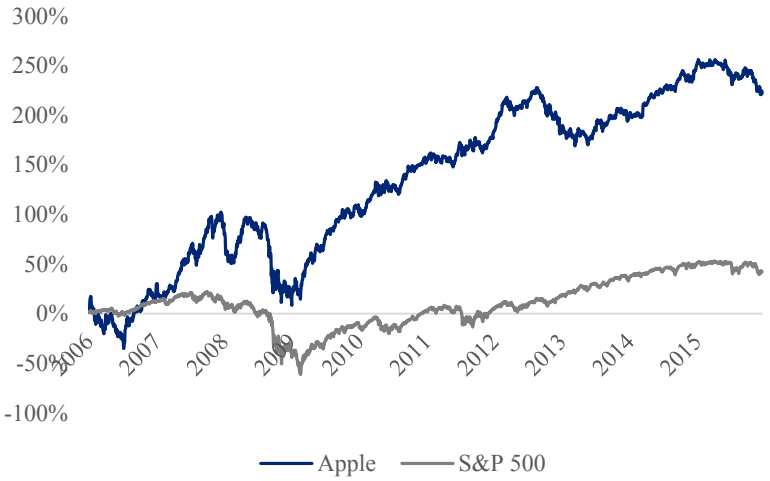
Date: 22-Sep-2015

Target price: $163

Revenue growth in FY16: 11%

P/E multiple: 15x

Exhibit 2: Apple vs. S&P 500 performance (%), 2006 - 2015



Source: Thomson Reuters and own analysis

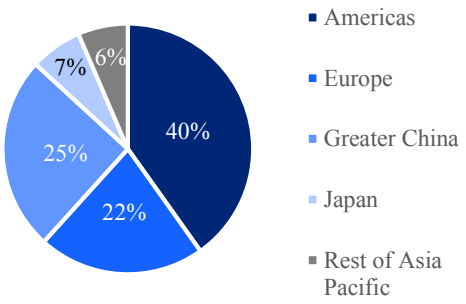
VALUATION

The target price presented here was reached by a DCF valuation model under several assumptions, all of which made solely based on publicly available information. Although I believe it is the most suited valuation model to value Apple, I chose to present two other valuation approaches: Dividend Discount Model and multiples approach.

The first was used simply to prove that even though Apple has started to distribute dividends a few years ago, most of its free cash flow to the equity has a different destiny other than dividend payments, so the company is clearly undervalued by this model.

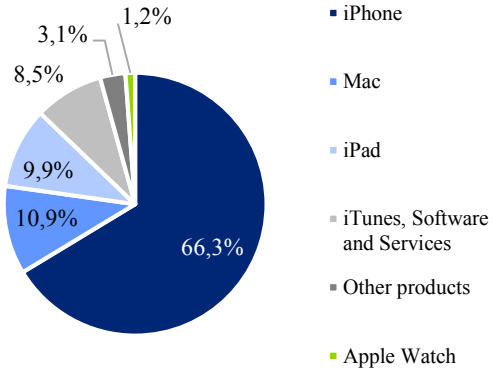
The second approach – Relative valuation – proved to be a solid approach, providing a target price between the current market stock price and the one reached by the DCF valuation.

Sales by geography



Source: Apple annual report and own analysis

Sales by product



Source: Apple annual report and own analysis

Cost of capital assumptions

Cost of Equity	9,69%
Risk free	2,25%
Equity risk premium	6,44%
Levered Beta	1,15

Relative Valuation

	EV/EBITDA	PER
Mean	207,4 (13 x)	154,2 (18,5 x)
Median	143,9 (9 x)	133,5 (16 x)

Abstract

This dissertation presents a valuation of Apple Inc., an American company that sits amongst the largest companies in the world, in market capitalization terms. Although it started as a computer company, back in 1976, nowadays it is best known for its smartphone flagship – the iPhone, introduced in 2007, it revolutionized the entire mobile phone industry. Today, the iPhone represents about 66% of total sales, however there are other products in Apple's product line that are considered by a large number of people to be the best in its category, such as the MacBook, the iMac, the iPad, the apple watch and others.

In this Equity valuation of Apple, I decided to use three different methods: the Discounted Cash Flow method, the Dividend Discount Model and Relative Valuation. Since all valuation models have their own assumptions and corresponding advantages and disadvantages, each of these approaches achieved different results, however I believe the most accurate was the one provided by the Discounted Cash Flow model, through which I obtained a target price of $196 per share.

In order to better evaluate the valuation performed, another valuation of Apple was considered as a comparison research, to understand different assumptions and why I should have or have not made different assumptions in my valuation. The other research used was the Goldman Sachs research report.

Acknowledgements

Writing this dissertation was a unique experience. It was a long journey, but in the end it was very pleasant to look back and see what I have accomplished. This marks the end of my master's degree at Católica Lisbon, a place that taught me a lot and helped me grow as a person, a place where I met wonderful people that definitely had a positive impact on my life.

I would like to thank my advisor, Professor Tudela Martins, who was always available to answer all my questions. He showed great availability to discuss any topic and had an important input to this dissertation.

I would also like to thank all my friends that were always there for me. Special thanks to Francisco Seixas, who was always available to help and motivate me.

Finally, I would like to thank my family, who supported and motivated me to go through this process and have always made available all the resources for me to succeed. To my girlfriend I want thank for her patience and understanding during this period of intensive work, and for pushing me forward in the toughest moments.

"The people who are crazy enough to think they can change the world are the ones who do", Steve Jobs

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1. Introduction

Valuation plays a key role in more aspects than people think. Not only is it used in equity researches, mergers and acquisitions and many different cases, but any person should have some knowledge on firm valuation. Both being a private investor on the stock market, or someone who is starting its own business, having valuation skills is crucial in order to get some insights on the expected return and also the risks he or she is taking. Many more examples on how valuation is important could be stated here, but the key point is that everyone should know the basics of this topic to better assess risk on investments, deal with financing issues and estimate revenue and costs. This dissertation focus on firm valuation, which means it is best suited for academic and professional people of that area, however anyone interested in the topic can read and learn about it.

The first part of this dissertation is about the theory of valuation in finance and understanding all the different methods that exist. All of them have some advantages and disadvantages in comparison to each other, and there are specific circumstances where one method is better suited than another, either by type of company or industry or a different reason. In this part I try to assess all issues of the most popular models and choose the ones to be used in the second part, which is the valuation of Apple.

The point of the second part of this dissertation is to reach a final target price for Apple, a publicly traded company in the US that is now one of the most valuable companies in the world by market capitalization. The valuation of this company was performed with three different methods: a DCF approach, multiples and DDM were the ones chosen. The reason for choosing three different approaches is to check reliability on the final share value achieved, instead of just relying on one model.

In chapter 5 a Sensitivity Analysis on the target price is performed, using the cost of capital and the perpetuity growth rate as drivers of this value.

Finally, chapter 6 covers a comparison between the target prices of Apple achieved in this dissertation with the one reached by an analyst of Goldman Sachs, in order to assess what differs from each other and understand different assumptions that were made in both valuations.

2. Literature Review

2.1 Valuation approaches

Valuation is a very important issue and many consider it to be the heart of finance. Since it has such an important role, one would assume the subject is well researched and documented, although it is not the case. Valuation is still a much discussed topic and many aspects, such as risk assessment and how to best estimate cash flows and reconciling different version of models, are not receiving the attention they deserve (Damodaran, 2006).

Damodaran (2006) states that there are four approaches to valuation. The first being discounted cash flow, which values an asset to the present value of its future cash flows. The second is liquidation and accounting valuation, and it uses accounting estimates of value or book value as starting point of the valuation. The third, relative valuation, makes the use of comparable companies to estimate the value of an asset, by looking to a common variable such as earnings, sales, cash flows or book value. Lastly there is the contingent claim approach, which uses option pricing models to value an asset that involves option characteristics.

Each approach has its own advantages and disadvantages, and focuses on different points of the valuation issue at the expense of not considering other aspects. Like Young, et. al. (1999) say: "different insights might be gained by focusing on EBITDA, or dividends or returns on capital". Although they also say that all valuation approaches should be possible to express in terms of another, being that all of them are mathematically equivalent.

There is no best model to use in any valuation, as each of them has its own uniqueness. The choice to which approach to choose in each case should be made by which has the most robust characteristics to data imperfections. However it is advisable to value a company using more than one approach (Young, et. al., 1999).

2.1.1 Discounted Cash-Flow (DCF)

Miller and Modigliani (1958) note that the value of a firm can be defined as the present value of its after-tax operating cash flows:

$$Firm\ value = \sum_{t=1}^{t=\infty} \frac{E(X_t - I_t)}{(1 + Cost\ of\ Capital)^t}$$

Where,

X_t = net operating profit less adjusted taxes plus depreciation and amortization expenses

I_t = Investment needs

The most used approach in the academic world is definitely the discounted cash flows valuation. It values an asset by estimating its future cash flows and discounts them at a specific rate that reflects the riskiness of these cash flows. In a DCF valuation, the value of an asset is not what one perceives it to be worth, but a function on the expected cash flows on that asset. So the higher and more predictable the cash flows are, the higher the value of the asset should be (Damodaran, 2006).

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

The authors also present other assumptions made in a discounted cash flow approach, they are: marginal return on capital equals average return on capital; the debt to equity ratio remains constant; interest rates are constant; minorities and associate companies are ignored in the valuation process; no distinction between accruals and cash flow in steady state.

2.1.2 Dividend Discount Model (DDM)

Buying stock in publicly traded companies generate two possible cash flows: dividends during the holding period and the expected price at the end of the holding period. Since the price of a stock is a function of its future dividend payments, the value of a stock is the present value of the dividends in perpetuity (Damodaran, 2006).

$$Value\ per\ share\ of\ stock = \sum_{t=1}^{t=\infty} \frac{E(DPS_t)}{(1+k_e)^t}$$

Where,

E(DPS) = Expected dividend per share in period t

k_e = Cost of equity

In order to estimate expected dividends, one has to make assumptions on expected growth rates in earnings and payout ratios. The required rate of return on a stock is determined by its riskiness, and there different types to measure it – the market beta in the CAPM, and the factor betas in the arbitrage and multi-factor models (Damodaran, 2006).

Although the dividend discount model is not very popular among analysts, as many argue that its focus on dividends is too narrow, it does have some reasoning behind it. The model is very attractive in its simplicity and intuitive logic, and at the end of the day dividends represent the only cash flow that is tangible to investors. Another advantage of the DDM is that we do not need as much estimate assumptions to forecast dividends as we do to forecast free cash flows. Finally, it can be argued that managers set dividends at levels the company can sustain forever, despite earnings being volatile by nature, thus yielding greater levels of confidence on dividends forecast and less volatile valuations over time (Damodaran, 2006).

2.1.3 Free Cash Flow to the Firm (FCFF)

In a discounted cash flow valuation, one of the two approaches we have is to value the entire business, both assets-in-place and growth assets, which is termed as firm or enterprise valuation. This approach uses the cash flows after reinvestment needs and before debt repayments, which are defined as Free Cash Flows to the Firm, and the discount rate that reflects the cost of financing of these cash flows from all sources of capital is the cost of capital (Damodaran, 2006). The free cash flow to the firm can be defined as such:

Free Cash Flow to the Firm = After-tax Operating Income – (Capital Expenditures – Depreciation) – Change in Net Working Capital

Damodaran (2006) notes that the value of the firm can be written as the present value of expected future cash flows:

$$Value\ of\ firm = \sum_{t=1}^{t=\infty} \frac{FCFF_t}{(1+WACC)^t}$$

Where,

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

WACC = Weighted Average Cost of Capital

The WACC is the discount rate used to discount free cash flows, so that we obtain the same result as a valuation using free cash flows to equity discounted at the cost of equity (k_e). The

equity value of a firm can be obtained by subtracting outstanding debt to the firm value calculated using the WACC (Fernandez, 2010).

$$WACC_{t+1} = \frac{E_t Ke_{t+1} + D_t Kd_{t+1}(1-T)}{E_t + D_t}$$

Where T is the effective tax rate, $E_t + D_t$ are the Equity and Debt values, respectively, k_e and k_d are the cost of equity and cost of debt, respectively.

The FCFF model is best suited in cases where one is valuing a firm whose leverage is constant scthrough time, since forecasting debt issues and debt repayments can be very difficult. Because FCFF is a pre-debt cash flow, these debt related cash flows do not have to be considered in its calculation, while they have to be considered in the FCFE model (Damodaran, 2002).

2.1.4 Free Cash Flow to Equity (FCFE)

The other way we have is to just value the Equity stake of the business, and this approach is called equity valuation. One can always get to the value of Equity, by netting out the value of all non-equity claims from the firm value. The free cash flows to equity are the cash flows after reinvestment needs and debt repayments and the discount rate that reflects the cost of equity financing is the cost of equity (Damodaran, 2006).

Free Cash Flow to Equity = Net Income

- (Capital Expenditures – Depreciation)

- (Change in non-cash Working Capital)

+ (New Debt Issued – Debt Repayments)

This cash flow is to be distributed as dividends or stock buybacks, however sometimes firms may distribute less than they have available due to many reasons. It can be because companies are usually reluctant to change dividends in a desire for stability, because the variability in dividends is lower than the variability in earnings. Another reason may be that the company is expecting future increases in capital expenditure so it chooses to keep some of the excess cash to finance these investments. Other different reasons may be behind this decision, such as tax factors, managerial self-interest and the use of dividends as signals of future prospects (Damodaran, 2002).

According to Damodaran (2002), the FCFE model with constant growth is best suitable to firms with a stable rate of growth, and the value of equity can be calculated as such:

$$P_0 = \frac{FCFE_1}{k_e - g_n}$$

Where,

P_0 = Value of stock today

$FCFE_1$ = Expected FCFE next year

K_e = Cost of equity of the firm

g_n = Growth rate in FCFE for the firm forever

Although the output from the FCFE model and the Dividend Discount model are equal sometimes, they can also differ from each other frequently. This difference results from the definition of free cash flow to equity that the two models use. While the Dividend Discount model uses the expected dividend on the stock, the FCFE uses the residual cash flow after all financial obligations and investment needs have been met (Damodaran, 2002).

Damodaran (2002) concludes his comparison of the two models by stating that the FCFE model is the most suitable between the two for valuing firms for takeovers or when there is a chance of changing corporate control.

2.1.5 Adjusted Present Value (APV)

In the approaches presented so far, the discount rate incorporates the effects of debt financing, while in the APV approach the value of debt benefits and costs are estimated separately from the value of operating assets. In this approach, we begin to value the firm as if it was entirely equity financed, only after adding the net value of benefits and costs of borrowing. Usually, using debt as a source of capital creates tax benefits, since interest expenses are tax deductible, while it also increases the firm's expected bankruptcy costs (Damodaran, 2006).

> Value of firm = Value of firm with 100% equity financing + Present value of Expected Tax Benefits of Debt – Expected Bankruptcy Costs

"Firms, it is argued, do not state target debt as a ratio of market value (as implied by the cost of capital approach) but in dollar value terms." (Damodaran, 2006).

$$Value\ of\ Tax\ Benefits = \sum_{t=1}^{t=\infty} \frac{Tax\ Rate_t * Interest\ Rate_t * Debt_t}{(1+r)^t}$$

Fernandez (2010) states that the value of tax shields depends on the debt policy of the company. If the debt level remains constant over time, the tax shields should be discounted at the cost of debt, however when the leverage ratio is fixed Miles-Ezzel applies.

Value of Tax Benefits = (Tax Rate) (Debt) = t_cD

According to Cooper and Nyborg (2007) the formula above implies that the company is expected to pay full corporate taxes every year forever and that the amount of debt is fixed, also forever. The approach is often called the Miller and Modigliani (M&M) approach, because they were the ones to publish.

PV of Expected Bankruptcy Costs = (Probability of Bankruptcy) (PV of Bankruptcy Costs) = π_aBC

Luehrman (1997) describes the APV model as an approach that relies on the principle of additivity, meaning we can split a project or firm into pieces, value each of them, and then add them back together. This is the opposite strategy that the WACC method presents, where we discount all of the pieces only once, giving it a big advantage in this field over the APV method.

2.1.6 Relative Valuation

Relative valuation is an approach used by many analysts due to its simplicity and quick results. It bases the valuation of a company on the market price of assets of "comparable" companies. Damodaran (2002) presents a statistic of 90% of equity research valuations use relative valuation, as well as 50% of acquisition valuations use the same approach.

This technique has three separate steps. The first step is to identify the comparable firms that will constitute our peer group. The second step is to define a common variable that will be used to reach our valuation output. The last step is to adjust for differences across assets, for example a higher growth company should have a higher multiple than a lower growth company (Damodaran, 2006).

Damodaran (2006) defines a comparable firm as one with similar cash flows, growth potential and risk to the firm subject to the valuation. While most analysts define comparable firms to be other firms in the same business sector, the definition stated before does not make this argument and thus, companies from different industries can be used as comparable as long as they present similar cash flows, growth and risk.

Using multiples to value a company has several advantages over the discounted cash flow approach, one being that future cash flows and an appropriate discount rate are already

considered in the multiple itself, avoiding the exhaustive and perhaps inaccurate task of estimating these cash flows and selecting a theoretical model of the appropriate discount rate (Ruback, et. al, 1999).

The authors also say that the method of multiples would be very superior the discounted cash flow approach, if a truly comparable firm or transaction were available, the basis of substitutability could be determined, and if we could have a reliable estimation of the multiple.

Some disadvantages to the multiples method are the basis of substitutability, since it chosen qualitatively as a measure of financial/operating performance (sales, EBITDA, etc.), measuring the multiple using a simple mean or median of a set of publicly traded firms is not very accurate, and finally choosing the comparable firms also present a challenge (Ruback, et. al, 1999).

Analysts often misapply multiples, using an historical average of an industry price-to-earnings ratio and then multiplying it by the firm to which they intend to perform a valuation. However, they overlook the fact that companies in the same industry can have much different levels of growth opportunities and capital structures (Goedhart, 2005).

The authors present four principles to properly apply a multiples valuation: the use of peers with similar ROIC and expected growth rates, the use of forward-looking multiples, enterprise to value multiples are often more accurate, and the adjustment of EV multiples for non-operating items.

Multiples vary little among peers in mature industries. While there are some cases where companies outperform their competitors, research show that in the long run growth and returns tend to converge, so it is very difficult to predict which companies will do so (Koller et. al., 2012).

Comparing multiples, Koller et. al. (2012) argue that some multiples are better than others. Looking at the P/E ratio, differences in the capital structure and other non-operating items may influence this ratio, a firm with higher debt than another, everything else remained equal, would normally have a lower P/E ratio, even though they have the same enterprise value to earnings ratio. Due to this fact, investors prefer to use enterprise value multiples, such as the EV/EBITDA or the EV/EBIT.

Finance theory tells us that companies with higher growth and returns on capital should also have higher multiples, and while this is true, investors also question if such companies will be able to sustain these high levels of growth and return. Thus, as with revenue growth, incremental revenue growth will converge to levels of those of the competition (Koller et. al., 2012).

Goedhart et. al. (2005) suggest analyst should perform a multiples valuation in order to stress test the results obtained from cash flow forecasts, to understand what differences exist between one company and its competitors and whether it is able to create more value than them.

2.1.7 Option Pricing Valuation

Option Pricing Valuation is a method to value precisely that, options and opportunities, and opportunities can be seen as possible future operations. Deciding how much to spend on R&D or CAPEX is an opportunity valuation, thus spending now does not create a cash flow but the opportunity to invest again later (Luehrman, 1997).

Leslie and Michaels (1997) indicate that option analysis and valuation is best identifiable in investment-intensive industries, such as oil extraction, because they have clear investment decision stages throughout the entire process, like licensing, exploration, appraisal, and development, each stage with the option to be pursued or abandoned. Although this type of industries are the clearest to this type of valuation, every company in every industry has to decide how to allocate resources, (eg. investing in a new company or creating a new line of business), which represents the choice whether to invest or do nothing. Getting a clear picture of these options is important to all managers in every company, because each choice creates a set of cash flows that originate further choices through time. Therefore, managers can make decisions as if they were thinking in terms of options.

Even though the concept of real options is obvious to everyone, its true benefits for business are not as clear. When a company is deciding, for instance, whether to develop a mine or a gas field, there are lots of uncertainties, like the market price of the output and the quantity it will be able to extract, therefore presenting a real options problem for the company (Kopeland and Keenan, 1998).

Another example the authors give on the uncertainty around an option, is an electric utility that has the option of bringing a mothballed coal-fired plant back on line. The biggest uncertainty here is the volatility of the market price of electricity. Thus the company has the option of keeping the plant unused and turning it back on when electricity prices rise, providing higher returns for the firm.

A situation where many managers can make use of real options valuation is in the case of staged investments, which are very common in nowadays businesses. Managers have the option to abandon or scale up their investments, and these compounded options can be really valuable. Decisions about expanding a business into other geographic areas or investing in research and

development projects are also included in this type of staged investments and should be approached as a real options issue (Kopeland and Keenan, 1998).

Real options can be valued the same way as financial options, which is by using the Black-Scholes formula:

$Se^{-\delta t} * \{N(d1)\} - Xe^{-rt} * \{N(d2)\}$,

Where, $d1 = \{\ln(S/X) + (r - \delta + \sigma 2/2)t/\sigma * \sqrt{t}$,

$d2 = d1 - \sigma * \sqrt{t}$,

and where S = stock price, X = exercise price, δ = dividends, r = risk-free interest rate, σ = uncertainty, t = time to expiry, and N(d) = cumulative normal distribution function (Leslie and Michaels, 1997).

Leslie and Michaels (1997) conclude in their paper that NPV analysis recognizes the present value of expected cash flows and fixed costs, while option valuation offers more detail, capturing NPV plus the value of flexibility (the expected value of the change in NPV over the option's life). Real options strategies get their advantage over other valuation model in the sense that they capture uncertainty.

2.1.8 Economic Value Added (EVA)

Damodaran (2006) states that the economic value added measures the surplus value generated by an investment. Here is the formula he presents:

> Economic Value Added = (Return on Capital Invested – Cost of Capital) (Capital Invested) = After-tax operating income – (Cost of Capital) (Capital Invested)

The author also presents the following formula as the net present value of the project:

$$NPV = \sum_{t=1}^{t=n} \frac{EVA_t}{(1 + k_c)^t}$$

Where,

EVA_t = Economic value added by the project in year t with maturity n

K_c = Cost of capital

Damodaran (2006) points out many disadvantages to this model, such as how much capital is invested in the firm's assets, because market value includes not only capital invested in assets but also in expected future growth. So then we consider the book value of capital as the capital

invested in assets in place, however this value considers many different accounting decisions made throughout time on how to depreciate assets, value inventory and deal with acquisitions, making the book value of capital "too flawed to be fixable".

Young et. al. (1999) argue that EVA is a rearrangement of discounted cash flow and that we can be precise about the EVA fair value estimate but not about the elements behind this estimation.

2.2 Further Issues

2.2.1 Cost of Equity

The cost of equity is the required return on equity demanded by shareholders of a company. It is also one of the components of WACC, the discount rate used in a DCF valuation when the firm has leverage.

The cost of equity is calculated using the expected return implied by the Capital Asset Pricing Model (CAPM), which assumes three key components should be considered: a risk free rate (the rate at which one can get a return without any risk associated), a beta (specific risk to the company) and a market risk premium (difference between market return and risk free return).

If we assume that cash flows present the same risk as that of the firm's assets and the firm has no debt, the appropriate discount rate is the unlevered (all-equity) cost of capital using the Capital Asset Pricing Model. The unlevered cost of capital can also be seen as the before-tax weighted average cost of capital (Kaplan et. al., 1995).

The risk free rate used in the CAPM should be the rate of long-term government bonds, with similar duration to that of the expected cash flows and at the time we are calculating the cost of equity, not an historical average of the risk free rate (Fernández, 2004).

As for the beta used in the CAPM, Fenández (2004) argues that we should not use the historical beta of a company, since betas vary dramatically. Regarding the market risk premium, the author also defends that this metric should not be equal to the historical risk premium, because it changes considerably through years, thus the market risk premium used in the calculation of the required return on equity is an expectation and not an historical average.

2.2.2 Cost of Debt

The same way shareholders ask for a "premium" on their invested capital, lenders also hope to make an expected return on their investments in the form of a premium for the default risk, which is called the cost of debt. Along with the cost of equity, an analyst should consider all

forms of financing for the company and calculate a weighted average of these two costs, in order to reach the cost of capital. (Damodaran, 2002).

Damodaran (2002) states that the cost of debt is composed by three parameters, them being the risk-free rate (an increase in this rate results in an increase of the cost of debt), the default risk of the company (a higher default risk means a higher cost of borrowing) and the tax advantage associated with debt (interest is tax deductible, so the higher the interest rate, a greater benefit for the company). The author also suggests that for firms which have highly traded long term bonds outstanding, one can compute a yield to use as the cost of debt, by using the market price of the bond, its coupon and maturity.

2.2.3 Terminal Value

To calculate the terminal value one has to start with cash flow from the last forecasted year and adjust for differences between capital expenditures and depreciation and amortization. Kaplan and Ruback (1995) argue that, assuming a growing perpetuity, capital expenditures should be as large as or greater than depreciation and amortization. However in their study, they conclude that on average depreciation and amortization exceed capital expenditures on the last forecasted year.

Kaplan and Ruback (1995) state that the growth used in the calculation of the terminal cash flow should reflect both inflation growth and real growth. Whatever value chosen for growth on the terminal cash flow, it should not be greater than inflation growth and GDP growth, otherwise the company would be growing in perpetuity at a greater pace than the economy itself and would outgrow the country it is in.

The value of a firm can be equal to its terminal value, if it is growing at a stable rate that can be sustained through perpetuity:

$$Value\ of\ firm = \frac{FCFF_1}{WACC - g_n}$$

Where,

$FCFF_1$ = Expected FCFF next year

WACC = Weighted average cost of capital

g_n = Growth rate in the FCFF (forever)

There are some similarities between this model and other equity discounted models. First, the growth rate in use must be less than or equal to the one of the economy, and second, the firm

has to present enough characteristics that sustain the consistency with the assumptions of stable growth. Also implicit in the use of a constant cost of capital for a growing company is the assumption that the debt ration of the firm remains unchanged over time (Damodaran, 2006).

Despite the terminal value being by far the most important element in a valuation estimate, it is very difficult to estimate without any uncertainty, and while analysts devote most of their time forecasting the next few years, determining the terminal value does not take nearly as much time. However this is natural since there is more information about the near future (Young et. al., 1999).

2.3 Valuation in emerging markets

Valuing firms or portfolios in emerging markets carry some particularities that have to be well analyzed and considered in valuation models. Places like Asia or South America are known to have a higher volatile macroeconomic environment and therefore greater risk. So, the key issue here is to know how to measure emerging market risk when valuing a company/portfolio.

James and Koller (2000) method of choice for valuing these types of firms is a DCF with probability-weighted scenarios. They conclude in their paper that there are two ways to incorporate the risks these companies face in a DCF valuation: either increase the risk premium in the discount rate by including country specific risk premium, or by assimilating these risks in the cash flows. Because most managers choose to adjust the discount rate with a risk premium, "they receive little insight into the way specific risks affect a company's value. (…) By contrast, analyzing specific risks and their impact on value permits managers to make better plans to mitigate them".

There are many macroeconomic factors that can affect a company's performance, such as inflation, interest rates and GDP growth, although not all companies are affected the same way by them, and there are even firms that carry less risk than the government, so these risks "do not apply equally to all industries or even to all companies" (James and Koller, 2000).

James and Koller (2000) suggest to construct scenarios around the macroeconomic factors and combine the risks in the cash flows, to better analyze how each factor affects the company's cash flows.

"Academic research into stock market returns over the past 20 years has turned up little correlation between returns on investments in emerging economies and those in the rest of the world", say Goedhart and Haden (2003). This low level of correlation means that emerging market risk can be well diversified in the long run.

2.4 Research Conclusion

After a deep analysis of all the existing valuation models, I decided to use the Discounted Cash Flow method, as it is the most widely used model in firm valuation and it relies on free cash flow, which represents money left for investors in the company. The second model I chose is the Dividend Discount Model, even though Apple did not pay dividends until a few years ago, it has now a history of four years of dividend payments and I wanted to see if one can perform a trustworthy valuation of the firm using this method. The third and final method used was the multiples method, also widely used by professionals and academic people, because it is one of the simplest and most reliable valuation models to use, and has some advantages over others, as we have seen before.

3. Apple – The Company and Industry Analysis

3.1 Apple Inc. | The Company

This dissertation carries out a valuation of Apple Inc., an American multinational technology company, headquartered in Cupertino California. Apple is known for designing, developing and selling consumer products, in particular for the iPhone (smartphone), the iPad (tablet), the Mac (personal computer), the iPod (portable media player) and the Apple Watch (smartwatch). Apple is also behind Operating Systems such as iOS and OS X and other major software applications such as iTunes (media player) and major Online Services, namely the iTunes Store, iOS App Store, Mac App Store, iCloud and most recently Apple Music.

3.1.1 History

The company was first established in April 1st 1976, by Steve Jobs, Steve Wozniak and Ronald Wayne, under the name Apple Computer Company. In June 1976, Ron Wayne left Apple and sold his shares to Jobs and Wozniak for $800. On January 3rd, 1977, Apple was incorporated and changed its name to Apple Computer Inc.

Steve Wozniak began building the Apple I computer in his garage in Los Altos, California, using simple tools and parts purchased at local electronic shops. Their first marketable product, the Apple I, was a very basic design and only consisted of a motherboard. Only 200 units were manufactured and it was sold for $666.

The Apple II launched in April 1977 and it presented some improvements over the Apple I, both in capabilities and design. The Apple II offered a redesigned TV interface and introduced graphics and color, which made it a complete new concept to the industry of personal computers. Also during this time, Apple Computer partnered with the millionaire Mike Markkula, who loaned the company $250,000. With this money, Apple was able to successfully market the Apple II computer and sell over 750,000 units. Apple Computer also changed its logo to a multicolored aspect, which represented the future of color in computer screens.

The Apple III was the end of the Apple series computers and eventual complete discontinuation. On the positive side, on December of 1980, Apple Computer went public at $22 per share, generating more capital than any other company since Ford Motors in 1956. This instantly created more millionaires than any other company ever in history.

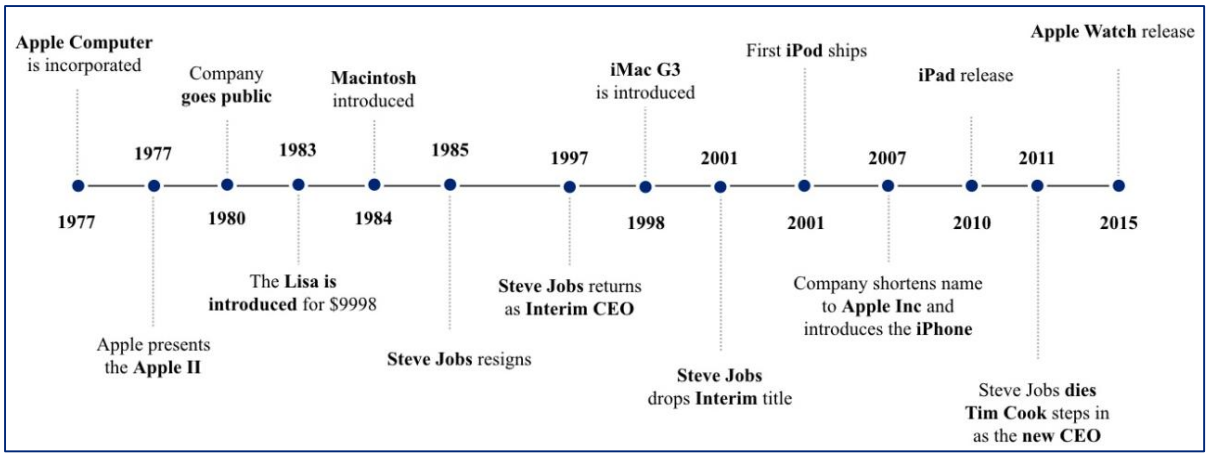
On January 22nd 1984, Apple Computer introduced its newly designed Macintosh computer in

its award-winning commercial "1984" during Super Bowl 18. Two days later, the Macintosh officially went on sale for $2,495 and was the personal computer to be designed solely around GUI.

The year of 1985 brought the first sign of problems for Apple. The CEO of Apple, John Sculley places limits on Steve Jobs' abilities to launch new, expensive and untested products. Jobs attempts to oust the CEO from leadership but unsuccessfully. The board of directors removed Jobs from managerial duties, which made him resign and sell all but one of his 6.5 million Apple shares for $70 million. From 1986 to 1996, Apple saw a graduate decline in the market while attempting to launch several products like digital cameras, portable CD players and video consoles, which resulted in extensive layoffs throughout the company.

Apple began its resurgence in 1997 with the return of Steve Jobs as interim CEO. Jobs restructured the company and even redesigned the logo with a more modern look. In 1998, Apple released the iMac which sold over 800,000 units in the first 5 months. During his 2nd term, Jobs saved Apple, which was 90 days away from bankruptcy, and turned around from 14 years of decline.

Exhibit 3: Apple history timeline



Source: Own analysis

Since that time, Apple's strategy moved from having an extensive line of products, to having only signature products to each market segment. With revolutions in computers, music and cellphones, Apple was able to dramatically increase its shareholder value. From 2003 to 2006, Apple increased its share price from $6 to $80, and its market cap surpassed Dell's for the first time. On January 9, 2007, Apple Computer officially changed its name to Apple Inc., signifying mobile technology, not computers, would be the company's main focus moving forward. Since 2002 Apple has introduced many successful products in the mobile technology industry in

addition to its computer lineup, like the iPod, the iPhone and the iPad.

Over the years, Apple has purchased many technology companies, such as Siri and Next. They made huge advances in areas like “Intelligent Software Assistant” with Siri and cloud-sourced data with iCloud.

3.2 Business Model

Apple’s business model has changed dramatically over the years, especially if we put in perspective most periods before 1997, when Apple had a licensing model in place for its software (Mac OS). In this dissertation, I will only go deep on Apple’s current business model that dates back to 1997, when Steve Jobs returned to the company has interim CEO.

3.2.1 Keys to Success

Apple has always had one key component backing its success: Hardware and Software integration. This is so true that other large companies are now aiming towards the same model (Microsoft with the Surface and Google with the Nexus for example). Software and Hardware integration is what allowed Apple to stay years ahead of its competitors every time it released a new line of products on complete user experience. When the company controls only a single side of the two, it might lack the ability to implement all the key features one might need to make a blockbuster product.

Still, even with one controlling both software and hardware, there is a piece of the loop that remains out of reach when aiming for the complete user experience: Retail. Hardware and Software integration has not changed much since Apple was created, but what changed dramatically in 2001, when Apple opened its first two Apple Retail Stores, was the ability to stay closer to its customers during their pre-buying experience with Apple’s products. At the time, Steve Jobs believed this was the missing piece in the goal towards complete control of user centric experience and it would soon be proven right when thousands of people line up to get new products right from these Apple Stores.

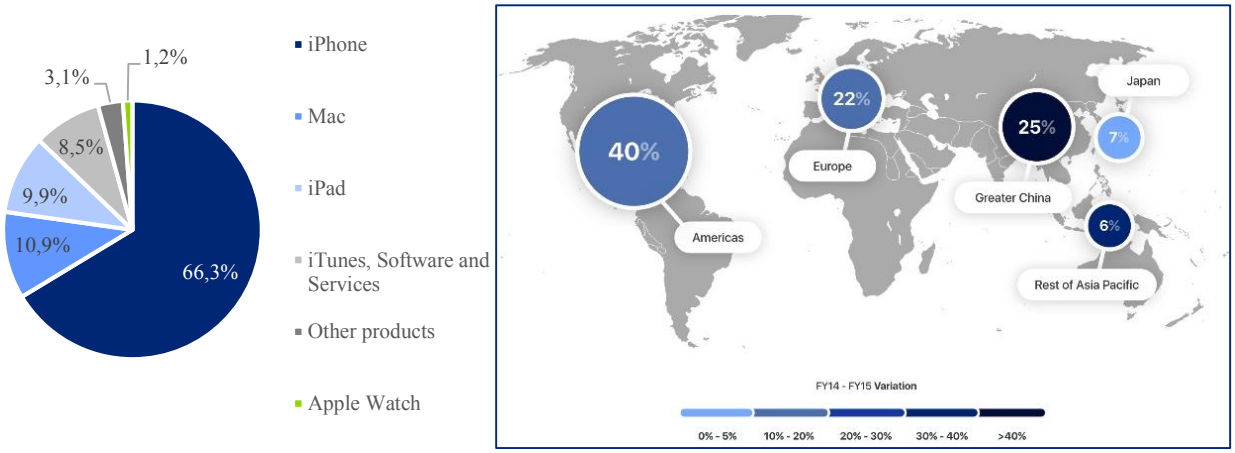
There is one other major aspect for Apple’s success: Design. The Apple brand is linked with what most people consider amazing design aligned with simplicity, common examples of it are the “Scrolling Wheel” on the iPod or the “Home Button” on the iPhone. Design is a huge part of Apple’s branding and that goes way beyond its operating systems or, even, product design. The whole notion of the company’s design extends to its packaging and even components within products that will never been seen by the people who use them, but that is precisely what

makes customers remain so loyal to the company.

3.2.2 Lines of Business

Apple splits its products into iPhone, iPad, Mac, Services (iTunes Store, App Store, Mac App Store, iBook Store and Apple Music) and Other Products (Apple TV, Apple Watch, Beats Products, iPod and Apple-branded and third- party accessories). However, I will consider a broader scope and allocate all these products into three main categories: Computing Software & Hardware, Mobile Devices and Services.

Exhibit 4: Sales by product category and region



Source: Apple annual report and own analysis

Computing Hardware & Software has been with Apple since its birth and it defined the primary roots of the company, especially when looking out for dominating both hardware and software components and it is yet a main piece of its strategy for the personal computer market. The Mac is not the market leader computer, but it has seen steady growth for the last decade for its Mac segment, in opposition with the PC Industry.

From the next table, we can see the top players of the pc market, with Lenovo and HP taking almost 40% of total market share. On the other hand, all of these top players have had negative growth for the past two years, while Apple had double digits growth (16,1%), proving that even though the industry has seen better days, they are still attracting more customers every year to buy a Mac.

Exhibit 5: PC shipments (in thousands of units) – Main players by market share

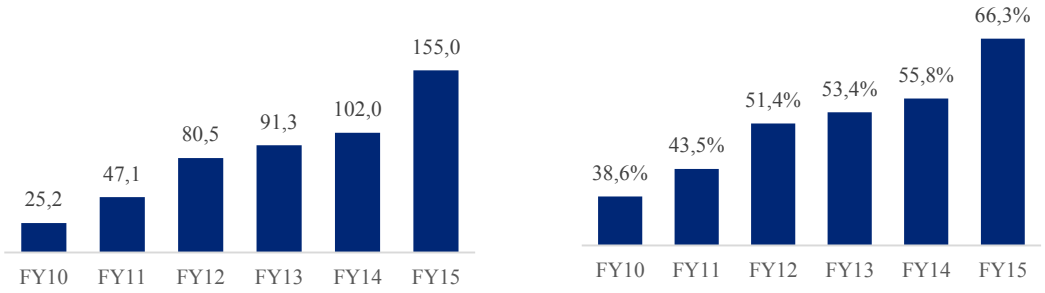
Vendor	2Q15 Shipments	2Q15 Market Share	2Q14 Shipments	2Q14 Market Share	2Q15/2Q14 Growth
1. Lenovo	13.444	20,3%	14.535	19,4%	-7,5%
2. HP	12.253	18,5%	13.675	18,2%	-10,4%
3. Dell	9.560	14,5%	10.466	14,0%	-8,7%
4. Apple	5.136	7,8%	4.423	5,9%	16,1%
5. Acer Group	4.334	6,6%	5.932	7,9%	-26,9%
6. ASUS	4.330	6,5%	4.693	6,3%	-7,7%
Others	17.082	25,8%	21.274	28,4%	-19,7%
Total	**66.139**	**100,0%**	**74.998**	**100,0%**	**-11,8%**

Source: IDC and own analysis

The year of 2001 was the starting point for Apple's shift in its strategy for mainly Desktop and Laptop Personal Computers to a bigger emphasis on the mobile form with the iPod and later with the introduction of the iPhone, iPad and, more recently, the Apple Watch. In fact, the iPod was a big hit for Apple, but the iPhone is what changed the course of action for the company.

It's easy to see the growth pattern that came with the launch of the iPhone. In under a decade, the iPhone rose from non-existence to $155B in revenue last year, and helps to show the link between source and effect once we take a look to the product share of revenue evolution since its launch in 2007. This is why I deliberately want to keep mobile devices a clearly marked line of business, not just because where Apple's core strategy is at this point, but to help emphasize the importance of the iPhone today, on Apple's financials and how it has become the primary source of revenue for the company.

Exhibit 6: iPhone sales analysis ($Billion) and (%) of total sales



Source: Apple annual report and own analysis

Finally, there is the Services category. The first thing one needs to understand regarding Apple's services is that there is a clear link between the growth of this category, its revenue and the growth of mobile devices sales as well. The first major service Apple added to its portfolio was the iTunes, back in day when iPods were in the center of the company's mobile strategy, but

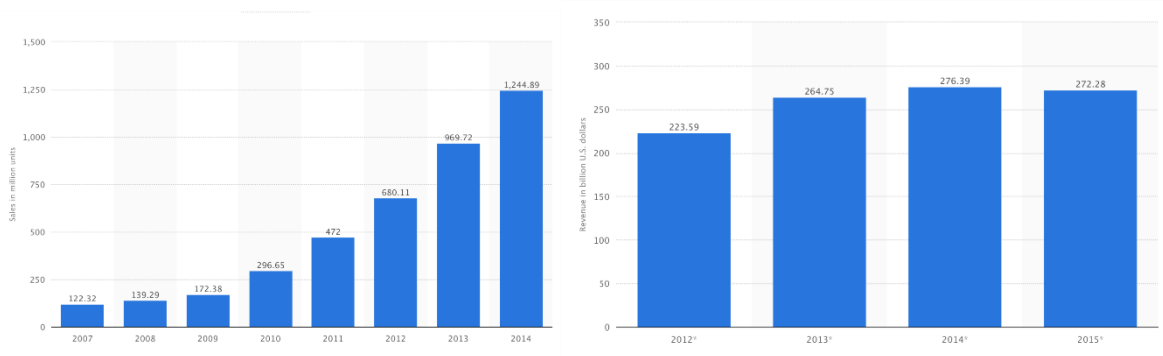
soon it started to split attentions with the App Store, which appeared later to support the demand for iPhone apps. It was only in 2011 that the company opened the App Store for Mac to broaden the App world to its computer segment.

3.3 Industry Analysis

Apple's lines of business are linked with different type of industries, making no sense to aggregate them all into a single analysis. For that reason, I will cover all the relevant indicators pointing back to different lines of business, although I will emphasize the smartphone market in particular given the importance of the iPhone for Apple's strategy.

3.3.1 Smartphone Market

Exhibit 7: Smartphones sold worldwide by million units (left) and by billions of US dollars (right)



Source: Statista

Starting with an overall look at the smartphone market, one can see the growth trajectory it has taken, regarding the number of units sold to end users on a global basis, with a CAGR of 39,3% and the market, in terms of revenue remained above the $270B mark in 2015. However, this last indicator doesn't seem to follow the growth trend of units sold, this is mainly due to the price oscillations of smartphones. In fact, currently there are many successful cases of other smartphones, like the OnePlus One, which is one example of a smartphone with a very attractive quality/price ratio and it sold over 1.5 million units in its first year, and although this may sound like a threat for Apple, the company takes it as an opportunity to capture both high end and low end segments of this market through the launch of a cheaper version of its iPhone model and keeping up with the good performance of the higher end versions.

Exhibit 8: Smartphone vendor market share

Period	Samsung	Apple	Huawei	Xiaomi	Lenovo	Others
2015 Q2	21,4%	**13,9%**	8,7%	5,6%	4,7%	45,7%
2014 Q2	24,8%	**11,6%**	6,7%	4,6%	8,0%	44,3%
2013 Q2	31,9%	**12,9%**	4,3%	1,7%	5,7%	43,5%
2012 Q2	32,2%	**16,6%**	4,1%	1,0%	5,9%	40,2%

Source: IDC and own analysis

In the matter of main players in this market, I've identified the top five companies and the correspondent change in market share since the second quarter of 2012, which counts for a little under 55% of the whole market. Since that time, Samsung has been able to maintain the top position with the highest market share and Apple with the second highest, followed by Huawei, Xiaomi and Lenovo.

Exhibit 9: Smartphone OS market share

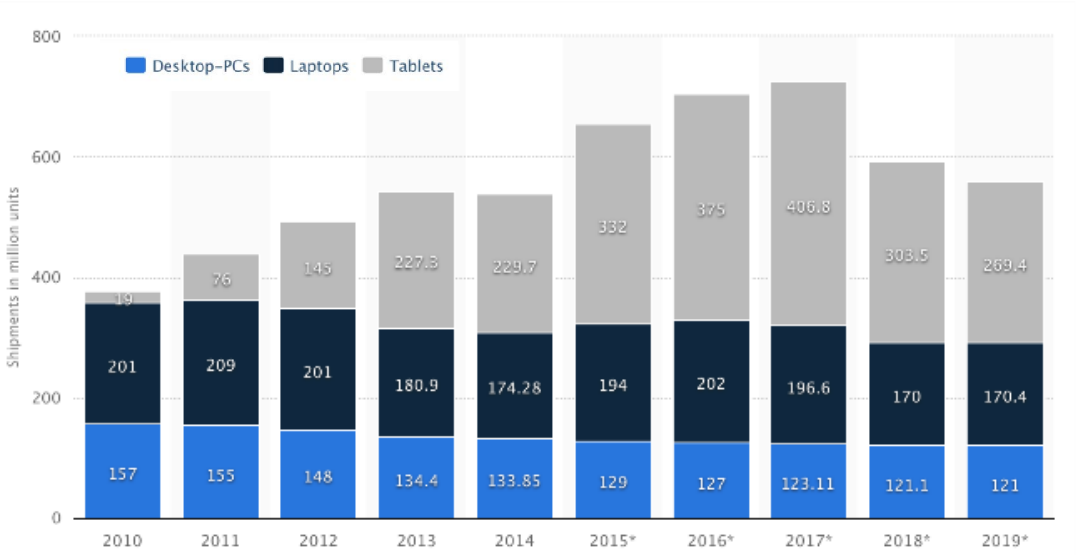
Period	Android	iOS	Windows Phone	Blackberry OS	Others
2015 Q2	82,8%	**13,9%**	2,6%	0,3%	0,4%
2014 Q2	84,8%	**11,6%**	2,5%	0,5%	0,7%
2013 Q2	79,8%	**12,9%**	3,5%	2,8%	1,2%
2012 Q2	69,3%	**16,6%**	3,1%	4,9%	6,1%

Source: IDC and own analysis

Smartphones have both Hardware and Software components and Apple weights in on both, so it makes sense for us to understand not just the market leaders in smartphone sales but also which are the predominant Operating Systems for this market. Apple, comes in second again, following the colossal Android OS (Google), which has been on a growing trend and last year accounted for 82,8% of the whole market. Android was developed by Google and is an OS software licensed to smartphone manufacturers, whereas iOS is a software only used by Apple, the same way Windows Phone is for Windows' Phones and the Blackberry OS is for Blackberry phones.

3.3.2 Computer, Tablet and Other Markets

Exhibit 10: Tablet and PC industry analysis



Source: Statista

For all aspects and purposes the concept of tablet only reached mass market in 2010, with the introduction of the iPad, but the notion of tablet did not come as a standalone category, it fits within the boundaries of a Personal Computer or PC, which fundamentally tackles productivity needs. With that in mind, and looking at Exhibit 10, we can see how the increase in shipments for tablets seems to be replacing other forms of PC in the forecasts presented, reaching almost 270 million units shipped by 2019 and representing close to 50% of the units shipped between the three types of products. This actually makes sense since tablets have also changed a lot during the last half a decade, resembling the expected shape of a laptop with the integration of keyboards and other hardware specs, leading some analysts to name these type of products the "2-in-1 Tablets".

Similarly to what was already pointed for the iPhone case, Apple's strategy is to capture high-end segments of the markets it operates in and, for that reason, market share is not the core goal for Apple. As seen before in the Lines of Business section, Apple's Mac shipments have been almost consistently outscoring the PC market as a whole, in terms of Y-o-Y growth.

3.4 Apple Inc. Today

3.4.1 Strategic Scope

The story behind Apple always seems to put the company on track to release disruptive products that reshape industries and technology usage paradigms for mass markets on a global basis, but for the last half-decade, the company's strategy has shifted towards capturing the maximum value of its target markets. Simply put, since the launch of the iPad, Apple has been focused on innovating already existing products and to match the market's expectations on new releases.

3.4.2 The Future

The first thing I need to point out is that public information only goes so far, before any public announcements everything is nothing but a rumor, especially knowing that Apple is one of the most secretive companies in the world, but market trends seem to support some claims that arise on this topic.

First, let's start by what is rationally expected: the iPhone should be the center of Apple's strategy. Some analysts expect a newer 4-inch iPhone to tackle lower price markets as well as keeping loyalty with customers who appreciate a smaller screen and the iPhone 7 is one of the most anticipated smartphones in the world even if the record points September, this year, as the date of its announcement.

Second, the continuous evolution seen on AR (Augmented Reality) and AI (Artificial Intelligence) seems to be opening doors for the creation of new markets and lead some analysts to believe Apple should be making a move anytime soon to present its own project to stay on track with Microsoft's Holo Lens and Facebook's Oculus Rift.

Third, the "Titan". Rumors of Apple entering the automotive market have been around for years now, especially after rumors of Steve Jobs discussing ideas on the subject. "Project Titan" is the supposed codename for Apple's project of building a car of its own and this might not sound so absurd if we look at Tesla's example and how starting from scratch in this market can actually deliver results.

Finally, there's another aspect: new markets, more specifically, India. Apple is getting serious about India and the company wants to expand its retail outlets in one of the fastest-growing smartphone markets. This might not raise eyebrows if one is looking for innovation, but it might open doors to sustain the growth of sales for the iPhone and the whole line of products, even with the peak of more mature markets such as the U.S, Europe and even China.

4. Valuation

4.1 Inputs

To address the issue of valuation for this company, the most suitable way would be to estimate future sales based on projected growth for each product segment. Following this thought, it is crucial to understand which are the main drivers of Apple's sales and pay special attention to those.

4.1.1 Sales

The first thing to decide in a forecasting exercise is the explicit period, which is the number of years that will take the company to reach a steady state. In this valuation I will assume that Apple will reach a steady state in five years' time – 2020. This assumption is supported by heavy research on experts' opinions on the subject of Apple future sales, which conclusion I take is that Apple is close to reach its peak of iPhone sales and the industry of smartphones is not growing as fast as it once was. Since the iPhone is and has been the main driver of Apple's growth, once it starts to slow down, which I assume will happen in the next 5 years, the company will reach a steady state of growth. The other products sold by the company will not be able to sustain its high growth, as many are already in a steady state.

The best way to forecast sales for Apple is to get a clear picture of the different industry segments its products are in and what direction they are taking. Firstly, I identified the segments and what proportion of Apple sales correspond to each of them. Secondly, I researched on all the market segments and gathered several opinions from different studies of how much these industry segments are supposed to grow in a five years period. Thirdly, I also researched on what is the current Apple's market share in each of the segments and how much it is expected to be in five years' time. Lastly, I merged all of this information and calculated the compounded annual growth rate for each of the products Apple currently sells and forecast total sales.

IPhone sales represent nearly 2/3 of total sales, which means it is the most crucial element to estimate and deviations in forecast vs actual sales in the future can cause a big impact on the company's intrinsic value. Therefore I pay special attention to this component.

For the sales of iPhone, iPad and Apple Watch, I gathered research from several sources on industry forecast and Apple's market share forecast. I then computed a constant annual growth rate for each category and combined both the industry growth and Apple's market share growth.

Exhibit 11: CAGR forecast (2015-2020) by product category

Category	Industry	Apple market share	Apple sales growth
Smartphones	7,26%	-1,16%	6,01%
Tablets	3,20%	-2,64%	0,47%
Smartwatches	38,99%	2,25%	42,12%

Source: Own analysis. For a more in-depth analysis refer to Appendix exhibits 31 and 32

The table above resumes the research I did to estimate Apple's sales. The other product segment I could have included is personal computers, where the Mac is placed, however there is very little research on this segment, as analysts are more excited with new mobile technology, so I decided to look at historical sales for the Mac and use the last three years average growth rate, because it has had constant positive growth for the past years and is a category Apple pays a lot of attention to and I expect they will continue to innovate the Mac.

There are two categories that were not possible to forecast the same way due to their unique characteristics. The iTunes and Software category is very hard to find research for because there are too many minor services and features that Apple delivers to clients that are included in this group, and forecasting the entire category based on music and apps sold in the iTunes and App Store would be inaccurate. Since sales growth for this category has been decreasing for the past four years, I decided to use last year's growth rate to estimate future revenue from these services. As for the "Other products" category, the rationale is similar, meaning that there a lot of different products included here, and for this category, the average growth rate from last three years was used to estimate future sales. The next table summarizes the sales forecast for the explicit period.

Exhibit 12: Sales forecast by product category ($million)

Category	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
iPhone	91.279	101.991	155.041	164.365	174.249	184.728	195.837	207.614
variation (%)	16,00%	11,74%	52,01%	6,01%	6,01%	6,01%	6,01%	6,01%
iPad	31.980	30.283	23.227	23.337	23.447	23.558	23.669	23.781
variation (%)	3,31%	-5,31%	-23,30%	0,47%	0,47%	0,47%	0,47%	0,47%
Mac	21.483	24.079	25.471	26.352	27.264	28.208	29.184	30.193
variation (%)	-7,48%	12,08%	5,78%	3,46%	3,46%	3,46%	3,46%	3,46%
Other products	10.117	8.379	7.299	6.422	5.650	4.971	4.374	3.848
variation (%)	-5,98%	-17,18%	-12,89%	-12,02%	-12,02%	-12,02%	-12,02%	-12,02%
iTunes, Software and Services	16.051	18.063	19.909	21.944	24.186	26.658	29.382	32.385
variation (%)	24,52%	12,54%	10,22%	10,22%	10,22%	10,22%	10,22%	10,22%
Apple Watch	-	-	2.768	3.934	5.591	7.946	11.293	16.050
variation (%)	0,00%	0,00%	0,00%	42,12%	42,12%	42,12%	42,12%	42,12%
Total net sales	**170.910**	**182.795**	**233.715**	**246.353**	**260.388**	**276.069**	**293.739**	**313.872**
variation (%)		6,95%	27,86%	5,41%	5,70%	6,02%	6,40%	6,85%

Source: Apple annual report and own analysis

4.1.2 Costs

4.1.2.1 Cost of sales

The cost of sales represent the costs incurred by Apple to produce its products and they can take the form of raw materials, transportation, etc. These costs usually fluctuate with sales variation, thus I assumed these costs would represent a percentage of sales. This percentage was defined as the last 3 years average, which resulted in a ratio of 58,7%.

As a consequence of this cost of sales ratio, Apple achieves a constant Gross Margin of 41,3%, which is relatively similar to the ones of previous years as one can see from the table below.

Exhibit 13: Cost of sales and gross profit forecast ($million)

Cost of Sales	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Cost of Revenue	(106.606)	(112.258)	(122.192)	(144.585)	(152.822)	(162.025)	(172.395)	(184.211)
(%) of sales	62,4%	61,4%	52,3%	58,7%	58,7%	58,7%	58,7%	58,7%
Gross Profit	64.304	70.537	111.523	101.769	107.566	114.044	121.344	129.661
(%) Gross Margin	37,6%	38,6%	47,7%	41,3%	41,3%	41,3%	41,3%	41,3%

Source: Apple annual report and own analysis

4.1.2.2 Operating costs

In Apple's report, Operating costs include Selling, General and Administrative Expenses and Research & Development costs. To forecast these cost it is very important to understand what they are and how can they influence the valuation of the company.

Starting with SGA expenses, it represents all expenses related with personnel, share-based compensation, spending on marketing and advertising, and other similar operating costs. The table below shows how constant these costs have been in relation to sales (between 6,1% and 6,6% for the past 3 years), so I assumed a target ratio of 6,3% for the explicit period. As for R&D costs, these are related with the development of new innovative products, and its budget is usually defined as a percentage of sales, which is why I estimated these costs to be 3,1% of sales for the explicit period.

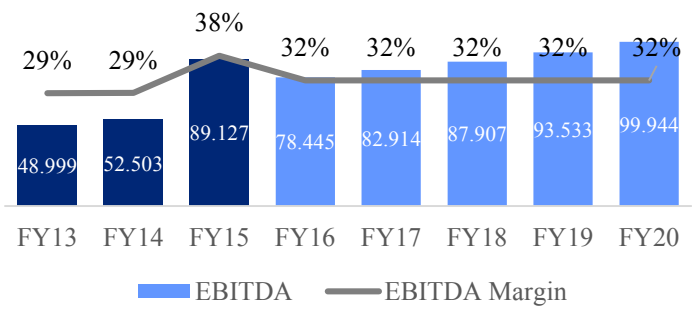
Exhibit 14: Operating expenses forecast ($million)

Operating costs	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Selling/General/Admin. Expenses	(10.830)	(11.993)	(14.329)	(15.626)	(16.516)	(17.511)	(18.631)	(19.908)
(%) of sales	6,3%	6,6%	6,1%	6,3%	6,3%	6,3%	6,3%	6,3%
Research & Development	(4.475)	(6.041)	(8.067)	(7.698)	(8.137)	(8.627)	(9.179)	(9.808)
(%) of sales	2,6%	3,3%	3,5%	3,1%	3,1%	3,1%	3,1%	3,1%
Total Operating Expense	(121.911)	(130.292)	(144.588)	(167.909)	(177.474)	(188.162)	(200.206)	(213.928)

Source: Apple annual report and own analysis

4.1.3 EBITDA margin

Exhibit 15: EBITDA forecast ($million)



Source: Apple annual report and own analysis

Once the items above are forecasted, it is possible to compute the EBITDA, by subtracting the operating costs to the gross margin. This results in an EBITDA margin of 32% for the forthcoming years, similar to what has happened in the previous years.

4.1.4 Working Capital

It is important to precisely forecast working capital needs, because it can highly influence a company's valuation. My approach to calculate working capital of Apple was to project each component influencing working capital, which are stated in the table below. The drivers influencing these items can also be found in the table, under Working Capital drivers.

Exhibit 16: Working Capital forecast ($million)

Working Capital	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Assets								
Accounts receivable	13.102	17.460	15.052	19.427	20.534	21.771	23.164	24.752
Inventories	1.764	2.111	2.098	2.483	2.624	2.783	2.961	3.164
Other current assets	10.335	14.124	13.476	14.205	15.014	15.918	16.937	18.098
Liabilities								
Accounts payable	22.367	30.196	31.705	37.515	39.652	42.040	44.731	47.797
Other current liabilities	16.509	19.255	8.891	9.371	9.905	10.502	11.174	11.940
Net Working Capital	(13.675)	(15.756)	(9.969)	(10.771)	(11.385)	(12.070)	(12.843)	(13.723)
Investment in NWC	822	(2.081)	5.787	(802)	(614)	(686)	(773)	(880)
Working Capital Drivers								
Revenue	170.910	182.795	233.715	246.353	260.388	276.069	293.739	313.872
Revenue growth	9%	7%	28%	5%	6%	6%	6%	7%
AR/revenue ratio	8%	10%	6%	8%	8%	8%	8%	8%
COGS growth	21%	5%	9%	18%	6%	6%	6%	7%

Source: Apple annual report and own analysis

The drivers "Revenue" and "Revenue growth" were already estimated before in this valuation, likewise "Cost of Sales growth". On the other hand, "Accounts Receivable/ Revenue ratio" was not calculated and assumed to be the average of the previous 3 years, since this ratio has relatively remained constant over that period.

These drivers influence the items below Assets and Liabilities, which are used to calculate working capital. Accounts receivable are projected simply by multiplying Revenue by AR/Revenue ratio. Inventories, as well as Accounts payable, will grow at the same rate as COGS growth. Lastly, other current assets and other current liabilities are assumed to grow at the same pace as revenue.

With all these items plotted, the working capital is calculated as the difference between Assets and Liabilities, as the table shows. Finally, changes in working capital were computed as the difference between one year and the year before. Analyzing the results, one can observe a constant need of working capital for Apple to finance its activities.

4.1.5 Capital expenditures

Capital expenditures represent investments made by companies in order to upgrade, replace or acquire specific assets. In the case of Apple, and according to its latest annual report, this expenditures include product tooling and process equipment, data centers, corporate facilities and infrastructure, including information systems hardware, software and enhancements, and retail store facilities.

Following this line of thoughts, one could assume that capital expenditures would have a high positive correlation with sales, since the company needs more equipment, facilities and data centers as sales and customer base grow. Therefore, I decided to forecast capital expenditures this way.

Exhibit 17: Capital expenditures forecast ($million)

Capital Expenditures	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Total Revenue	**170.910**	**182.795**	**233.715**	**246.353**	**260.388**	**276.069**	**293.739**	**313.872**
Total PPE, Gross	**28.519**	**39.015**	**44.003**	**46.690**	**49.350**	**52.322**	**55.671**	**59.487**
(%) of sales	16,7%	21,3%	18,8%	19,0%	19,0%	19,0%	*19,0%*	*19,0%*
D&A	**(6.757)**	**(7.946)**	**(9.819)**	**(10.330)**	**(10.919)**	**(11.576)**	**(12.317)**	**(13.161)**
D&A as % of PPE	23,7%	20,4%	22,3%	22,1%	22,1%	22,1%	*22,1%*	*22,1%*
CAPEX	**(9.076)**	**(9.813)**	**(10.020)**	**(12.290)**	**(12.990)**	**(13.772)**	**(14.654)**	**(15.658)**
(%) of sales	5,3%	5,4%	4,3%	5,0%	5,0%	5,0%	*5,0%*	*5,0%*

Source: Apple annual report and own analysis

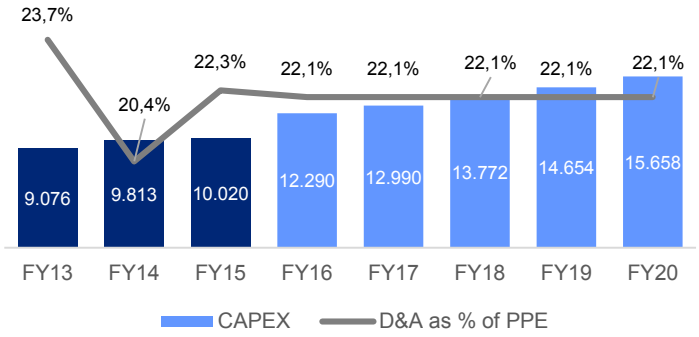
As it can be observed, CAPEX has been increasing over the years, which can be explained by the high growth of the company in past years. In order to forecast Capital Expenditures, I calculated an average of the last three years CAPEX/Sales ratio and projected the following years CAPEX as a percentage of sales using this ratio.

4.1.6 Depreciation and amortization

The best way to estimate depreciation and amortization expenses is through Property, Plant and Equipment variation, and for the same reason as why Capital Expenditures should be forecasted as a percentage of sales, PPE should also. Thus, I projected PPE as the last three years average PPE/Sales.

To get to depreciation and amortization, I calculated the last three years average D&A/PPE and multiplied it by PPE of that year.

Exhibit 18: CAPEX and Depreciation forecast ($million)



Source: Apple annual report and own analysis

4.1.7 Cost of capital

As of 2015, Apple has a Debt-to-Equity ratio of -22%, this means the company has negative net debt, due to its huge pile of cash, which is why I will use the cost of equity as the cost of capital for Apple. This ratio is similar to that of previous years, so I will assume this to be the target ratio.

Exhibit 19: Cost of Equity

Cost of Equity	9,69%
Risk free	2,25%
Equity risk premium	6,44%
Levered Beta	1,15

Source: Own analysis. Risk free rate retrieved from Thomson, beta from Yahoo Finance and ERP from Damodaran website.

Regarding the beta of the company, I used the 3 years monthly beta retrieved from Yahoo Finance. This is the unlevered beta, and by Yahoo's definition, it measures the company's stock price volatility relative to the market price volatility for a 3 years' time-frame, using a least squares linear regression line. On March 1st, Apple's 3y unlevered beta was 1,35, which I then levered and reached a levered beta of 1,15. The downgrade on the beta after applying Apple's

leverage ratio is due to the fact that the company has negative net debt, so leverage has a contrary effect on the beta.

The risk free rate used was the 10y US T-Bill, retrieved from Thomson as of January 11th, which was 2,25%. Regarding the Equity Risk Premium (rm-rf), I used Damodaran's database and got a value of 6,4%.

4.2 Output of DCF Valuation

With all parameters estimated, one can finally compute the free cash flow to the firm, as the table below shows.

Exhibit 20: FCFF calculation ($million)

DCF Valuation	FY16	FY17	FY18	FY19	FY20
EBIT(1-t)	**49.156**	**50.925**	**52.897**	**55.119**	**57.653**
+ Depreciation	10.330	10.919	11.576	12.317	13.161
- CAPEX	(12.290)	(12.990)	(13.772)	(14.654)	(15.658)
(%) of sales	4,99%	4,99%	4,99%	4,99%	4,99%
- Investment in NWC	(802)	(614)	(686)	(773)	(880)
FCFF	**46.394**	**48.239**	**50.015**	**52.009**	**54.276**
Cost of Capital	9,69%	9,69%	9,69%	9,69%	9,69%
PV (FCFF)	**42.297**	**40.095**	**37.900**	**35.930**	**34.185**

Source: Apple annual report and own analysis

A big part of a valuation is the terminal value, and this has not yet been calculated. Since no firm can outgrow the world's economy, I assumed cash flows will grow at the level of expected USA inflation in 2020 plus a weighted average of GDP growth by sales of each region (IMF forecasts), reaching a perpetuity growth rate of 5,4%, as demonstrated in Exhibit 21.

Exhibit 21: Perpetuity growth rate calculation

Region	Sales FY15 ($M)	Percentage	GDP 2020	Inflation 2020
America	93.864	40%	2,0%	2,2%
Europe	50.337	22%	1,6%	1,5%
Greater China	58.715	25%	6,5%	3,0%
Japan	15.706	7%	0,7%	0,6%
Rest of Asia Pacific	15.093	6%	6,3%	3,7%
Total net sales	233.715	100%		

Perpetuity growth (weighted average)	Weighted Average GDP growth	USA Inflation	Sum of GDP growth & Inflation
	3,23%	2,2%	**5,43%**

Source: Own analysis. GDP and inflation data retrieved from IMF.

Summing the present value of the terminal value with the free cash flows to the firm, we get to the Enterprise value. To get to the Equity value, we simply need to subtract the value of Net Debt, reaching a total value of nearly 1.096 billion US dollars, as we can observe from the table below.

Exhibit 22: Valuation output ($million)

Estimated value /share ($)	$196,41
Terminal cash flow	56.096
Terminal cost of capital	9,7%
Terminal value	1.319.204
PV(Terminal value)	757.499
PV(CF over next 5 years)	190.407
Enterprise Value (Sum of PV)	947.906
- Debt	57.586
+ Cash	205.666
Equity Value	1.095.986
Number of shares	5.580
Current market price ($)	119,27
Price as % of value	60,7%

Source: Apple annual report and own analysis

4.3 Dividend Discount Model

Despite Apple not distributing dividends to shareholders until only a few years ago, after Steve Jobs death in 2011, this was changed. Therefore, I decided to use the Dividend Discount Model to value Apple's Equity in order to analyze whether this is a good method to value the company or not.

As previously explained in the Literature Review chapter, DDM is one of the simplest and most straightforward models to use in firm valuation. One simply needs to estimate future dividends and discount them at the cost of equity to achieve the equity value.

Exhibit 23: Apple dividends historical information

Dividend analysis	2012	2013	2014	2015
Total dividend ($M)	2.488	10.564	11.000	11.400
# shares (M)	6.544	6.477	6.086	5.753
DPS ($)	0,38	1,63	1,81	1,98
EPS ($)	6,38	5,72	6,49	9,28
Dividend Payout Ratio (DPR)	6%	29%	28%	21%

Source: Apple annual report and own analysis

Since Apple started paying dividends only four years ago, it does not have a constant dividend payout ratio (DPR) yet, although the company expects to pay quarterly dividends of $0,52 and plans to increase its annual dividend, as it is stated in its annual report. The table above summarizes the historical dividend payments, where one can see a low DPR throughout all four years and even a decrease in this ratio in 2015. Due to this fact it is difficult to make assumptions on the dividend payout ratio, as there is no strong historical basis for it. As a consequence of that, I assumed that dividends will grow at the same pace as EBIT, which results in an average of 8,5% for the explicit period, since dividend payments are strongly correlated with earnings.

Exhibit 24: Apple dividends forecast

Dividend analysis	2016	2017	2018	2019	2020	Terminal year
Total dividend ($M)	12.369	13.420	14.561	15.799	17.142	17.485
# shares (M)	5.580	5.580	5.580	5.580	5.580	5.580
DPS ($)	2,22	2,41	2,61	2,83	3,07	3,13
EPS ($)	10,07	10,92	11,85	12,86	13,95	14,23

Source: Own analysis

Once I had all dividends forecasted, I simply discounted them, using the cost of equity as the discount rate, and computed the terminal value with the same perpetuity growth as the one used in the DCF model (5,4%), because it is the rate at which I assumed the firm will be growing at

steady stage. In the end, an Equity value of nearly $332 billion was reached, which represents a share value of $59,55.

Exhibit 25: Apple DDM output

Estimated value /share ($)	59,55
Sum of PV of Expected Dividends ($M)	73.291
Cost of Equity	9,69%
Terminal Value ($M)	411.182
PV of TV ($M)	258.976
Equity (sum of PV) ($M)	332.267
Number of shares (M)	5.580
Current market price ($)	119,27
Price as % of value	200%

Source: Apple annual report and own analysis

The conclusion I arrived by applying this valuation model to Apple is that it is not suited for the company in cause. Apple's historical dividend payout ratio is very low, meaning that the company has been using most of its free cash flow to the equity for other purposes, such as share buybacks. In its last annual report, Apple said that part of its investment plan is to repurchase its own stock, but did not specify any amount. As such, the share price achieved in this valuation is not credible and should not be considered in further comparisons in this dissertation.

4.4 Relative Valuation

Most academic textbooks and professional analysts advise to always perform a relative valuation in most firm valuation cases. In this chapter I present my multiples valuation on Apple, first explaining how I defined the peer group and then dive into the valuation itself, explaining which multiples I chose and why.

4.4.1 Peer group

Exhibit 26: Peer group analysis

Company	EBITDA margin	D/E	ROIC	ROE
HP Inc	15,2%	0,47	4,7%	7,0%
Alphabet Inc	32,6%	0,04	13,6%	14,6%
Motorola Solutions Inc	-13,3%	1,24	-8,3%	-21,8%
Microsoft Corp	36,5%	0,44	9,6%	14,4%
Samsung Electronics Co Ltd	20,9%	0,07	14,2%	15,1%
Apple	35,0%	0,54	28,2%	46,2%

Source: Thomson Reuters (Values for Motorola and Samsung correspond to 2014)

Since Apple is present in different sectors, such as communications, hardware and software and other technology related segments, I chose as peers some of the largest companies in these industry segments. The following companies constitute the peer group of my multiples valuation: HP, Google, Motorola, Microsoft and Samsung.

According to Thomson Reuters, these are the peer group companies' characteristics:

1. "Hewlett-Packard Company (HP) operates in a global scale and provides various solutions to its customers, such as technologies, software and services to individual consumers, small and medium sized companies and large companies. The company organizes its business units in: Personal Systems; Printing; the Enterprise Group (EG); Enterprise Services (ES); Software; HP Financial Services (HPFS); and Corporate Investments."
2. "Google Inc. is an American multinational company, part of a holding that includes many companies, which is called Alphabet. Specialized in internet-related products and services, Google retains the following business units: search, ads, Google Maps, apps, YouTube, Android and cloud infrastructure."
3. "Motorola provides communication infrastructure, devices, accessories, software and services."
4. "Microsoft is specialized in the development and licensing of software, but the company also designs and sells hardware. Its products include operating systems for computers

and mobile devices, phones and other intelligent devices, server applications, business solution applications, video game consoles, and others."

5. "Samsung is a Korean company with a focus in the development of consumer electronic products. Its operations are divided in three separate business units: consumer electronics (CE), which includes TVs, printers, air conditioners, refrigerators, and others, information technology & mobile communications (IM), which involves the production of computers, mobile phones, digital cameras, and others, and finally the device solutions (DS), where is included the development of semiconductor and display business parts."

4.4.2 Multiples valuation

The table below summarizes the valuation of Apple using its peers multiples to reach a target price. The parameters used in this valuation were the weighted average values of both multiples by the peers' market capitalization.

Exhibit 27: Multiples valuation

Company Name	EV/EBITDA	P/E Ratio	Market Cap ($M)
HP Inc	5,37	7,01	23.000
Alphabet Inc	20,18	23,42	477.020
Motorola Solutions Inc	10,01	15,99	11.090
Microsoft Corp	9,01	16,90	396.730
Samsung Electronics Co Ltd	2,55	9,37	157.750
Mean	**12,99**	**18,48**	
Median	**9,01**	**15,99**	

Source: Thomson Reuters and own analysis

Referring to the median results achieved from the table above, once multiplied by Apple's EBITDA, the EV/EBITDA multiple gives us a price target of $143,9. Regarding the PER multiple, it is multiplied by the company's Net Profit and then divided by the number of shares. The PER multiple gives Apple a valuation of $133,5 per share.

Exhibit 28: Relative valuation output ($)

	EV/EBITDA	PER
Target price ($)	143,9 (9 x)	133,5 (16 x)

Source: Own analysis

Because it uses the enterprise value, the EV/EBITDA multiple is usually more reliable, since changes in the company's capital structure do not affect it like it does on the PER multiple, and also because it uses the EBITDA instead of net profit, in which case the latter includes costs of

depreciation and amortization that can be easily manipulated and other non-operating costs that do not represent a "true" cost for the firm's operating business and are in many cases one-time events. Both these facts can mislead a valuation and that is why one should be careful when using a PER multiple in a relative valuation.

Due to Apple's uniqueness in its business model and great dimension, there is no company that is truly comparable with it. Despite the firms chosen for the peer group belonging to the same industry sectors as Apple and sharing some of its features, they also have many differences and may not have as great expectations for the future as Apple does. Therefore, I find this to be the reason behind the lower share prices reached in this valuation when compared to the one reached with the DCF method.

5. Sensitivity Analysis

It is very important, when performing a valuation on any given company, to always create a sensitivity analysis to the one or two most important variables on the valuation. In the DCF model presented before, the two variables that can have a high impact on the final output – share value – are the discount rate and the perpetuity growth rate. Therefore I decided to base my sensitivity analysis on these two variables and see how a variation of the two can change the share value of Apple.

Exhibit 29: Sensitivity analysis ($)

	11,62%	10,66%	9,69%	8,81%	8,07%
7,07%	174	214	283	413	696
6,52%	162	193	244	329	472
5,98%	151	177	217	277	365
5,43%	143	165	**196**	241	301
4,94%	136	155	182	218	263
4,53%	132	149	172	202	239
4,18%	128	144	165	191	223

Source: Own analysis

In this analysis, a variation of 10% on the discount rate was used (top head row), as well as a variation of 10% on the perpetuity growth rate (left column). As one can see from the presented table, an increase in the cost of capital has a negative effect on the share value, while on the contrary, an increase on the growth rate has a positive impact on the share value. The base stock price of Apple achieved in the DCF valuation is highlighted in the center of the table.

Going into more detail, maintaining the growth rate constant, the worst case scenario we get is a share value of $143, corresponding to an increase of 20% on the cost of capital, while the best case scenario is a share value of $301 with a decrease of 20% on the cost of capital. Doing the same for the perpetuity growth rate, we get the highest share price of $283 for an increase of 30% on the growth, while a decrease of 30% pushes the share price down to $165. Analyzing the impact of both variables at the same time we get in the best case scenario a share value of $696 (+30% on the growth and -20% on the cost of capital) and a share price of $128 on the worst case scenario (-30% on the growth rate and +20% on the cost of capital).

An important conclusion to take from this analysis is that a variation of 10% on the cost of capital has a much higher impact on Apple's share value than the same variation on the perpetuity growth rate.

6. Investment Bank report comparison

This chapter presents a comparison between the target price reached in this dissertation and the report published by Goldman Sachs on September 22nd 2015. The report forecasts key figures of Apple until 2017, a smaller explicit period than the one used in this dissertation, which presents a 5 year explicit period forecasted. Therefore, only 2016 and 2017 were taken into account in this comparison.

An important notice is that Goldman Sachs performed a multiples valuation to reach a target price on its report, whereas this dissertation's main focus in on the DCF approach, relating to the multiples valuation as a complementary method. As a consequence, differences between both valuations may be explained by such.

Exhibit 30: Comparison between GS and this dissertation's forecasts ($million)

$M		FY16	FY17	CAGR 15-17
Total revenue	GS	256.776,1	285.573,6	11%
	Dissertation	246.353,4	260.388,0	6%
Cost of goods sold	GS	(155.033,4)	(170.862,8)	
	Dissertation	(144.584,6)	(152.821,5)	
SG&A	GS	(16.307,3)	(17.620,3)	
	Dissertation	(15.625,8)	(16.516,0)	
R&D	GS	(8.706,9)	(9.619,4)	
	Dissertation	(7.698,4)	(8.136,9)	
Depreciation & amortization	GS	(12.336,0)	(12.336,0)	
	Dissertation	(10.330,0)	(10.918,5)	
EBIT	GS	76.728,5	87.471,1	5%
	Dissertation	68.114,6	71.995,1	-5%
Capital expenditures	GS	(13.152,7)	(14.043,6)	
	Dissertation	(12.290)	(12.990)	
Common dividends paid	GS	12.061,6	12.839,0	6%
	Dissertation	12.369,0	13.420,4	9%

Source: Goldman Sachs research report on Apple and own analysis

The investment bank's report presents a 12-month price target of $163 with a "buy" recommendation, which is below this dissertation's target price of $196. GS estimates a compounded annual growth rate of 11% for revenues (2015-2017) reaching $285.573,6 million in 2017, compared to 6% estimated in this dissertation ($260.388,0 million). Regarding costs of goods sold, the report expects them to be about 60% of sales ($170.862,8 million in 2017), while it was considered a 59% ratio in this dissertation's valuation, corresponding to $152.821,5 million in 2017, so a very similar forecast in both valuations.

Regarding operating expenses, both SG&A and R&D expenses seem to be estimated the same way in both valuation, with the first representing 6% of sales and the latter being 3%. However, because the values of sales are different in the two valuations, these expenses also have different values. GS report estimates SG&A and R&D expenses to be $17.620,3 million and $9.619,4 million respectively, while in this dissertation these expenses forecast are $16.516,0 million and $8.136,9 million respectively (values for 2017).

Moreover, Goldman Sachs forecasted depreciation & amortization to be $12.336 million in both 2016 and 2017, very similar although a little over what is estimated in this dissertation ($10.330,0 million in 2016 and $10.918,5 million in 2017). This results in an expected EBIT of $87.471,1 million for 2017 in GS valuation, in comparison with a more conservative amount of $71.995,1 million reached in this valuation for the same year. Since all these expenses were similarly estimated in both valuations, one can conclude that this difference can only come from revenue forecasting. Capital expenditures are also similar between the two reports, representing about 5% of sales in both cases.

In relation to dividend payments, this dissertation has more optimistic expectations, with an estimated annual growth of 9% between 2015 and 2017, while Goldman Sachs estimates dividend payments to grow at a slower level of 6% annually for the same period.

In conclusion, although GS expects Apple to achieve a higher EBIT value in the near future than the one estimated in this dissertation, the lower target price it presents can be justified by the approach taken to compute it, which was a relative valuation, in comparison with a DCF valuation method used in this dissertation. Since different approaches were used, it is hard to take any conclusions from this price target difference, because there is no information about Goldman Sachs expectations for Apple's long term growth, which can have a big impact on the company's valuation as we have seen in the previous chapter.

7. Conclusion

As the Literature Review chapter shows, there are many approaches one can take in valuation, each one with its own advantages and disadvantages and more suitable in specific cases. Also, opinions of experts on the subject differ many times, suggesting that there is no superior method for valuation or it is yet to be found.

Regarding Apple, since Steve Jobs returned as CEO in 1997 and saved the company from going bankrupt (he said in an interview the company was 90 days away from bankruptcy), Apple has been growing consistently at a fast pace and has not shown any sights of slowing down.

To estimate the company's value, I used three different approaches on this report: DCF, DDM and Relative Valuation. The DCF and multiples valuation were the two methodologies that provided the most credible results and closest to other valuations performed by professional analysts like the one chosen as a comparison for this report. A target price of $196 was computed using the first method (65% higher than Apple's share price as of October 28th 2015), while the latter provided a target price of $134 using a PER multiple and $144 using an EV/EBITDA multiple. A problem with the multiples approach is that there is a tendency to undervalue companies with a lot of excess cash which is definitely the case for Apple. On the other hand, DDM proved that it is not an adequate approach to value Apple since the company's dividend payout ratio is too low, it achieved a very low share price in comparison with either the other two approaches or Goldman Sachs' research report.

According to the sensitivity analysis performed in this report, one can conclude that Apple is very sensitive to the perpetuity growth rate and its cost of capital, however the latter in much greater proportions. Keeping everything else constant, an increase of 20% of the cost of capital results in a downgrade of the target price from $196 to $143, while a decrease of 20% on the perpetuity growth rate results in a target price of $172. As a consequence of that, one can conclude that the DCF valuation is more sensitive to variations in the cost of capital. However, the cost of capital is less expected to change than the growth rate, due to Apple's capital structure of negative net debt, which is why the cost of equity was chosen as the discount rate for this valuation.

Since this valuation was performed using only publicly available information, a more accurate valuation could be achieved if the company would have provided some insights on the products it was working on and planning to launch in the future, since Apple is well known for its innovative spirit and top class products. For example, there are some rumors that the company

is currently working on an electric car concept to compete with Tesla Motors, however there is no confirmation about this topic and therefore it cannot be considered in this report.

To conclude, valuation is not an exact science like math or a social science like economics, in fact, I like to think of valuation as a combination of both. In my opinion, in order to carry a good valuation on any company one should have a set of two skills: “numbers” and “story telling”. What I mean by “numbers” is that being good and assertive in calculations is a key component when valuing a company. On the other hand, being good at “story telling” is as important, which is related to explaining why several assumptions are to be made and create a “story” behind why a company is good or bad and the path it is taking.

8. Appendix

Exhibit 31: Number of shipments in millions

Source	Smartphones			Tablets			Smartwatch		
	2015	2020	CAGR	2015	2020	CAGR	2015	2020	CAGR
Forbes							24,4	95	40,47%
IDC	1440	1900	7,18%	234,5	269,4	3,53%	23,8	85,1	37,51%
BI Intelligence				249	281	3,07%			
CSS Insight	1480	2000	7,82%						
prnewswire				-	-	3,00%			
statista	1432	1862	6,78%						
Average			**7,26%**			**3,20%**			**38,99%**

Source: Own analysis. Different sources of data are listed in the first column

Exhibit 32: Apple market share forecast

Source	Smartphones			Tablets			Smartwatch		
	2015	2020	CAGR	2015	2020	CAGR	2015	2020	CAGR
dazeinfo	15,60%	14,20%	-2,32%						
IDC			0%	25,60%	23,00%	-2,64%	58,30%	47,40%	-5,04%
BI Intelligence							40%	48%	9,54%
Average			**-1,16%**			**-2,64%**			**2,25%**
Sales growth			**6,01%**			**0,47%**			**42,12%**

Source: Own analysis. Different sources of data are listed in the first column

Note: in the previous two exhibits, some of the data in the 2020 column corresponds to 2019 in the source's website, however, for these cases, I assumed the same value for 2020 for the sake of simplicity.

Exhibit 33: Apple Income Statement (2010-2015)

Income Statement	2010	2011	2012	2013	2014	2015
Period End Date	25-Sep-2010	24-Sep-2011	29-Sep-2012	28-Sep-2013	27-Sep-2014	26-Sep-2015
Revenue	65.225	108.249	156.508	170.910	182.795	233.715
Cost of Revenue	39.541	64.431	87.846	106.606	112.258	140.089
Gross Profit	25.684	43.818	68.662	64.304	70.537	93.626
Selling/General/Admin. Expenses, Total	5.517	7.599	10.040	10.830	11.993	14.329
Selling/General/Administrative Expense	5.517	7.599	10.040	9.844	10.796	12.854
Labor & Related Expense	--	--	--	986	1.197	1.475
Research & Development	1.782	2.429	3.381	4.475	6.041	8.067
Total Operating Expense	46.840	74.459	101.267	121.911	130.292	162.485
Operating Income	18.385	33.790	55.241	48.999	52.503	71.230
Interest Expense, Net Non-Operating	--	--	--	(136)	(384)	(733)
Interest/Invest Income - Non-Operating	311	519	1.088	1.316	1.675	2.921
Interest Income - Non-Operating	311	519	1.088	1.616	1.795	2.921
Investment Income - Non-Operating	--	--	--	(300)	(120)	--
Interest Inc.(Exp.),Net-Non-Op., Total	311	519	1.088	1.180	1.291	2.188
Other, Net	(156)	(104)	(566)	(24)	(311)	(903)
Other Non-Operating Income (Expense)	(156)	(104)	(566)	(24)	(311)	(903)
Net Income Before Taxes	18.540	34.205	55.763	50.155	53.483	72.515
Provision for Income Taxes	4.527	8.283	14.030	13.118	13.973	19.121
Net Income After Taxes	14.013	25.922	41.733	37.037	39.510	53.394

Source: Thomson Reuters

Exhibit 34: Apple Cash Flow Statement (2010-2015)

Cash Flow Statement	2010	2011	2012	2013	2014	2015
Period End Date	25-Sep-2010	24-Sep-2011	29-Sep-2012	28-Sep-2013	27-Sep-2014	26-Sep-2015
Cash Flow-Operating Activities ($ Millions)						
Net Income/Starting Line	14.013	25.922	41.733	37.037	39.510	53.394
Depreciation/Depletion	1.027	1.814	3.277	6.757	7.946	11.257
Deferred Taxes	1.440	2.868	4.405	1.141	2.347	1.382
Non-Cash Items	903	1.168	1.740	2.253	2.863	3.586
Changes in Working Capital	1.212	5.757	(299)	6.478	7.047	11.647
Accounts Receivable	(4.860)	(1.791)	(6.965)	(1.949)	(6.452)	(3.124)
Inventories	(596)	275	(15)	(973)	(76)	(238)
Other Assets	(1.634)	(1.391)	(3.162)	1.080	167	(179)
Accounts Payable	6.307	2.515	4.467	2.340	5.938	5.400
Other Liabilities	1.995	6.149	5.376	5.980	7.470	9.788
Cash from Operating Activities	18.595	37.529	50.856	53.666	59.713	81.266
Cash Flow-Investing Activities ($ Millions)						
Capital Expenditures	(2.121)	(7.452)	(9.402)	(9.076)	(9.813)	(11.488)
Purchase of Fixed Assets	(2.005)	(4.260)	(8.295)	(8.165)	(9.571)	(11.247)
Purchase/Acquisition of Intangibles	(116)	(3.192)	(1.107)	(911)	(242)	(241)
Other Investing Cash Flow Items, Total	(11.733)	(32.967)	(38.825)	(24.698)	(12.766)	(44.786)
Acquisition of Business	(638)	(244)	(350)	(496)	(3.765)	(343)
Sale/Maturity of Investment	46.718	69.853	112.805	124.447	208.111	121.985
Purchase of Investments	(57.811)	(102.317)	(151.232)	(148.489)	(217.128)	(166.402)
Other Investing Cash Flow	(2)	(259)	(48)	(160)	16	(26)
Cash from Investing Activities	(13.854)	(40.419)	(48.227)	(33.774)	(22.579)	(56.274)
Cash Flow-Financing Activities ($ Millions)						
Financing Cash Flow Items	751	1.133	1.351	701	739	749
Other Financing Cash Flow	751	1.133	1.351	701	739	749
Total Cash Dividends Paid	--	0	(2.488)	(10.564)	(11.126)	(11.561)
Cash Dividends Paid - Common	--	0	(2.488)	(10.564)	(11.126)	(11.561)
Issuance (Retirement) of Stock, Net	506	311	(561)	(23.412)	(45.428)	(36.209)
Sale/Issuance of Common	912	831	665	530	730	543
Repurchase/Retirement of Common	(406)	(520)	(1.226)	(23.942)	(46.158)	(36.752)
Common Stock, Net	506	311	(561)	(23.412)	(45.428)	(36.209)
Issuance (Retirement) of Debt, Net	--	--	--	16.896	18.266	29.305
Short Term Debt, Net	--	--	--	--	6.306	2.191
Long Term Debt Issued	--	--	--	16.896	11.960	27.114
Long Term Debt, Net	--	--	--	16.896	11.960	27.114
Cash from Financing Activities	1.257	1.444	(1.698)	(16.379)	(37.549)	(17.716)

Source: Thomson Reuters

Exhibit 35: Apple Balance Sheet (2010-2015)

Balance Sheet	2010	2011	2012	2013	2014	2015
Assets						
Cash and Short Term Investments	25.620	25.952	29.129	40.546	25.077	37.164
Cash	1.690	2.903	3.109	8.705	10.232	9.336
Cash & Equivalents	9.571	6.912	7.637	5.554	3.612	9.531
Short Term Investments	14.359	16.137	18.383	26.287	11.233	18.296
Accounts Receivable - Trade, Net	5.510	5.369	10.930	13.102	17.460	15.052
Accounts Receivable - Trade, Gross	5.565	5.422	11.028	13.201	17.546	15.125
Provision for Doubtful Accounts	(55)	(53)	(98)	(99)	(86)	(73)
Total Receivables, Net	9.924	11.717	18.692	20.641	27.219	27.107
Receivables - Other	4.414	6.348	7.762	7.539	9.759	12.055
Total Inventory	1.051	776	791	1.764	2.111	2.098
Other Current Assets, Total	5.083	6.543	9.041	10.335	14.124	13.476
Deferred Income Tax - Current Asset	1.636	2.014	2.583	3.453	4.318	4.954
Other Current Assets	3.447	4.529	6.458	6.882	9.806	8.522
Total Current Assets	41.678	44.988	57.653	73.286	68.531	79.845
Property/Plant/Equipment, Total - Gross	7.234	11.768	21.887	28.519	39.015	44.003
Buildings - Gross	2.030	2.599	3.464	3.968	4.513	4.702
Land/Improvements - Gross	1.471	2.059	2.439	3.309	4.863	6.214
Machinery/Equipment - Gross	3.733	7.110	15.984	21.242	29.639	33.088
Property/Plant/Equipment, Total - Net	4.768	7.777	15.452	16.597	20.624	20.074
Accumulated Depreciation, Total	(2.466)	(3.991)	(6.435)	(11.922)	(18.391)	(23.929)
Goodwill, Net	741	896	1.135	1.577	4.616	4.570
Intangibles, Net	342	3.536	4.224	4.179	4.142	3.478
Intangibles - Gross	587	3.973	5.266	6.181	7.227	7.348
Accumulated Intangible Amortization	(245)	(437)	(1.042)	(2.002)	(3.085)	(3.870)
Long Term Investments	25.391	55.618	92.122	106.215	130.162	146.566
Other Long Term Assets, Total	2.263	3.556	5.478	5.146	3.764	4.963
Total Assets	**75.183**	**116.371**	**176.064**	**207.000**	**231.839**	**259.497**
Liabilities	-	-	-	-	-	-
Accounts Payable	12.015	14.632	21.175	22.367	30.196	31.705
Accrued Expenses	1.593	2.428	3.283	4.782	7.689	21.591
Notes Payable/Short Term Debt	-	-	-	-	6.308	9.826
Other Current liabilities, Total	7.114	10.910	14.084	16.509	19.255	8.891
Customer Advances	3.647	6.129	7.445	8.697	9.548	7.986
Income Taxes Payable	658	1.140	1.535	1.200	1.209	--
Other Current Liabilities	2.809	3.641	5.104	6.612	8.498	904
Total Current Liabilities	20.722	27.970	38.542	43.658	63.448	72.012
Total Long Term Debt	-	-	-	16.960	28.987	47.761
Total Debt	-	-	-	16.960	35.295	57.586
Deferred Income Tax	4.300	8.159	13.847	16.489	20.259	21.496
Other Liabilities, Total	2.370	3.627	5.465	6.344	7.598	11.604
Total Liabilities	**27.392**	**39.756**	**57.854**	**83.451**	**120.292**	**152.872**
Shareholders Equity	-	-	-	-	-	-
Common Stock, Total	10.668	13.331	16.422	19.764	23.313	24.492
Retained Earnings (Accumulated Deficit)	37.169	62.841	101.289	104.256	87.152	82.441
Unrealized Gain (Loss)	(217)	313	(232)	(280)	1.122	106
Other Equity, Total	171	130	731	(191)	(40)	(415)
Total Equity	**47.791**	**76.615**	**118.210**	**123.549**	**111.547**	**106.625**
Total Liabilities & Shareholders' Equity	**75.183**	**116.371**	**176.064**	**207.000**	**231.839**	**259.497**

Source: Thomson Reuters

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