

**MERGERS AND ACQUISITIONS: THE FACEBOOK AND  
WHATSAPP CASE**

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## **Resumo**

As redes sociais têm vindo a assumir uma forte relevância nos dias de hoje. Estas permitem aos seus utilizadores criarem perfis de forma a partilharem experiências, ideias e interagir com novas pessoas em tempo real. Uma das redes sociais mais populares em todo o mundo é o Facebook. Ao longo dos anos a estratégia do seu fundador e CEO, Mark Zuckerberg, passou pela aquisição de diversas empresas nomeadamente o Instagram, WhatsApp e Oculus. A aquisição do WhatsApp foi anunciada a 19 de fevereiro de 2014 sendo que foi bastante mediática devido aos 19 biliões de dólares pagos. O CEO do Facebook viu no WhatsApp a oportunidade de conquistar um público mais jovem e fiel. Adicionalmente esta empresa demonstrou um crescimento acima da média nos primeiros quatro anos, comparando com os seus principais concorrentes factor que influenciou o desfecho desta operação.

O objetivo do presente projeto é compreender as principais vantagens e desvantagens desta transacção bem como efetuar uma avaliação ao WhatsApp. Assim, será possível efetuar uma comparação com o montante pago pela empresa de Mark Zuckerberg. Iremos utilizar o método dos fluxos de caixa descontados (Free Cash Flow to the Firm e Free Cash Flow to the Equity) como base para avaliação. Esta foi complementada com uma análise de sensibilidade que tem como objetivo compreender o impacto que possíveis flutuações de algumas variáveis possam ter no valor da empresa.

**Palavras-Chave:** Avaliação de Empresas, Fusões e Aquisições, Fluxos de Caixa Descontados, Redes Sociais

**JEL Classification:** G34, L82

## **Abstract**

The social networks have been assuming a very strong relevance in our day to day. These allow users to create profiles in order to share experiences, ideas and interact with different people in real time. Facebook is one of the most international and popular social network. The strategy over the years by founder and CEO, Mark Zuckerberg, has been to acquire several companies, namely Instagram, WhatsApp and Oculus. The acquisition of WhatsApp was announced on 19<sup>th</sup> February 2014, which was quite newsworthy due to the \$19 billion paid by Facebook. The same CEO saw the opportunity for WhatsApp to win a younger and more loyal target audience. Additionally, this company showed a growth above average in the first four years, in comparison to its key competitors, which highly influenced the outcome of this operation.

The main objective of this project is to better understand the core advantages and disadvantages of this transaction as well as to make a valuation of WhatsApp. Thus, it will be possible to make a comparison with the amount paid by Mark Zuckerberg's company. We will apply the method of Discounted Cash Flows (Free Cash Flow to Equity and Free Cash Flow to Firm) in the valuation, complemented with a sensitivity analysis that aims to understand the impact of possible fluctuations of several variables may have on the company's value.

**Keywords:** Corporate Valuation, Merger and Acquisition, Discounted Cash Flows, Social Network

**JEL Classification:** G34, L82

## **List of Acronyms**

CAPEX – Capital Expenditure

CAPM – Capital Asset Pricing Mode

CEO – Chief Executive Officer

D&A – Depreciation and amortization

EBIT – Earnings Before Interest and Taxes

EBITDA - Earnings Before Interest Taxes Depreciation and Amortization

FCFE – Free Cash Flow to Equity

FCFF – Free Cash Flow to Firm

M&A – Mergers and Acquisitions

NWCN – Net Working Capital Needs

ROS – Return on Sales

U.S. – United States

WACC - Weighted Average Cost of Capital

WC – Working Capital

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## **1. Introduction**

The first form of communication was the exchange of correspondence, namely letters and postcards. A few years later came the telegraph which was a device that allowed people to send and receive long distance messages. After this innovation, the means of which we communicate changed dramatically with the appearance of telephone. In the 20<sup>th</sup> century technology began to develop quite fast, computers and the internet have emerged.

The first social network created was Six Degrees which allowed its users to create profiles and interact with other users. In the early 2000s, there was a big boom in social networks with the rise of My Space and YouTube (this allowed people to engage and interact through videos).

In 2006 Facebook and Twitter became accessible to all users around the globe. After three years, WhatsApp was released. In February 2014 it was announced the acquisition of WhatsApp by Facebook. In this transaction Facebook paid \$19 billion (\$3 billion in restricted stock units, \$4 billion in cash and \$12 billion in Facebook shares). At the time of this operation many were the critics and experts in the field who considered that this amount would be too excessive. One of the most noticeable consequences of the acquisition was the fall of 5% in the share price of Mark Zuckerberg's company after the deal was announced.

Considering all the media attention and speculation surrounding this purchase, the main objective of this thesis is to make a qualitative and quantitative analysis of this operation. Therefore, in an initial phase, we will understand the history and main milestones of both companies. Later we will analyze the direct competitors since nowadays, there is a wide variety on offer for the social network users. We will understand the advantages that led to the CEO of Facebook to make this acquisition and possible disadvantages that may arise from the operation.

Chapter 6 will describe the financial analysis where WhatsApp fair value is calculated using the Discounted Cash Flow Model (Free Cash Flow to Firm and Free Cash Flow to Equity). Since the latest WhatsApp released report is from 2013, a number of assumptions have been made based on comparable companies, such as Twitter. Lastly, since the variables can be very volatile, we performed a sensitivity analysis. The aim is to understand how some presumed assumptions have an impact on the company valuation.

## 2. Review of Literature

### 2.1. Introduction

The main purpose of this review of literature is to explain some insights of Mergers and Acquisitions and company valuation in order to support readers with different backgrounds.

The structure of the literature review is divided into two parts:

- Mergers and Acquisitions: explain the definition of M&A, the types and the history of M&A, the reasons to merge, the types of synergies and if this deal is worthwhile.
- Company Valuation: this topic describes the most common valuation methods: discounted cash flows and relative valuation.

### 2.2. Mergers and Acquisitions

#### 2.2.1. Definition

In the previous years, substantial research about mergers and acquisitions has been carried out, as scholars and authors are drawn to the complexity of this type of operation (Aggoud and Bourgeois, 2012). Aggoud and Bourgeois (2012) reinforce the idea that the main goal of this type of deal is to emphasize and increase the competitive position of the firm. For Gurrib (2015) the company acquisitions are a critical factor of corporate strategy and corporate finance.

Although the concept of mergers and acquisitions are typically mentioned together, they have different meanings. The main difference between the two concepts lies in the way in which the combination of the two firms is brought about (Roberts, Wallace and Moles, 2012). For DePamphilis (2011), a merger occurs with a combination of two or more companies. In this type of transaction, the buying firm assumes the assets and liabilities of the merged company (Gaughan, 2007). On the other hand, an acquisition happens when a firm takes a controlling ownership interest in another company, for example if company X acquires company Y, the second one might be totally absorbed and fade as an individual firm, or company X might hold company Y in its pre-acquired form. Gurrib said that corporate acquisitions increase the assets and the liabilities of a company, “...with a greater inclination towards increasing the assets base rather than the liability side.”

(Gurrib, 2015: 53). In his opinion, this fact makes it easier for the company to raise capital for investments in the future.

### 2.2.2. Types of Mergers and Acquisitions

Generally, mergers and acquisitions are categorized into three types: horizontal, vertical and conglomerate (Gaughan, 2007).

- Horizontal merger: occurs between two entities that are in the same industry, i.e., it takes place when competitors are combined (Gaughan, 2007). The benefits of this type of deal are economies of scale and “...possible increases in market power in a more concentrated industry.” (Rock, 1987:5).
- Vertical merger: is the one in which suppliers merge with buyers, this event leads companies to reduce transaction costs and the number of intermediaries. In this way it will be possible for the company to increase their market power by controlling the distribution channels (Aggoud and Bourgeois, 2012). This type of acquisition normally occurs when “...the market for the intermediate product is imperfect...” (Rock, 1987:5).
- Conglomerate merger: happens when the companies are not competitors and do not have a client-supplier relationship. This could be a useful method in disseminating business risk through a varied range of areas (Alam, Khan, Zafar; 2014). In this type of deal there is a risk of having an unfocused management since the team could be unfamiliar with the newly acquired business (Roberts, Wallace and Moles, 2012).

### 2.2.3. History of Mergers and Acquisitions

#### 2.2.3.1. Introduction

Mergers and acquisitions have evolved cyclically, many authors call these cycles “Merger Waves”.

These events have been characterized by a high level of mergers followed by periods of relatively fewer deals (Gaughan, 2007). There have been five waves since the end of the 19<sup>th</sup> century. In each wave, the peaks occurred more or less at the same time as the peaks of stock market booms (Gugler, Mueller and Weichselbaumer, 2012). Each wave had different features and is a consequence of different events and external circumstances.

However, in Roberts,Wallace and Moles (2012) opinion there are significant similarities between the first and the last wave.

### 2.2.3.2. Merger and Acquisition Waves

First Wave (1897-1904) – The first wave took place after the Depression of 1883 and lasted until the depression of 1904. This wave is characterized by changes in companies that belonged mostly in sectors like manufacturing, communication, transport and technology. In this wave the mergers were mostly horizontal combinations, in order to benefit from economies of scale (Gaughan, 2007). A large number of horizontal mergers caused a monopolistic market structure (Gaughan, 2007). Coca-Cola and General Electric are examples of companies that were established through the horizontal integration during this wave (Roberts,Wallace and Moles, 2012).

**Table 1 - First Wave (1897-1904)**

Year	No. of Mergers
1897	69
1898	303
1899	1,208
1900	340
1901	423
1902	379
1903	142
1904	79

Source: Gaughan (2007)

**Table 2 - Types of Mergers (1895-1904)**

Type of Merger	Percentage (%)
Horizontal	78,30
Vertical	12,00
Horizontal and Vertical	9,70

Source: Gaughan (2007)

Second Wave (1916-1929) – The second wave was interrupted in 1929 due to the stock market crash. During this period there was an increase in vertical integration (Lipton, 2006). According to Roberts, Wallace and Moles (2012) this wave is also referred to as the automobile wave. The first wave is known for creating large monopolies while the second one resulted in an oligopolistic industry structure (Gaughan, 2007). During the

second wave some well-known companies were established like General Motors and IBM (Gaughan, 2007).

Third Wave (1965-1969) – During this period companies were not able to develop horizontal and vertical mergers due to the anti-trust laws in the United States (Aggoud and Bourgeois, 2012). This induced firms to merge with other companies, which were not from the same sector of activity (Aggoud and Bourgeois, 2012). In this phase, it was common for small companies to target the larger ones for acquisition, in contrast, to the first two waves, in which the majority of the target firms were significantly smaller than the buyer company (Gaughan, 2007). Roberts, Wallace and Moles explained that one of the characteristics of this wave was “...a large number of management problem as acquirers experienced difficulty in managing their newly acquired assets...” (Roberts, Wallace and Moles, 2012:17). As a consequence of that there were several complications and failures.

**Table 3 - Third Wave (1965-1970)**

Year	No. of Mergers
1965	2,125
1966	2,377
1967	2,975
1968	4,462
1969	6,107
1970	5,152

Source: Gaughan (2007)

Fourth Wave (1984-1989) – The fourth wave is generally referred to as the takeover wave due to the appearance of hostile mergers that permitted the Investment Banks to contribute towards the investment of hostile takeover bids (Lipton, 2006).

Gaughan (2007) explains that if the board of the company agrees with the takeover, it is referred to as a friendly one. On the other hand, if the board does not approve the takeover, it is considered hostile. This period is famous for junk bond financing and an increase of Leverage Buyouts (Lipton, 2006). This wave comes to an end in 1989 when the junk bond market collapsed (Gaughan, 2007). This wave is also called the mega-mergers wave and

was mostly observed in industries like oil production and chemicals where the competition was considerably reduced (Roberts, Wallace and Moles, 2012).

**Table 4 – M&A (in \$ millions)**

<b>Year</b>	<b>Total Dollar Paid</b>	<b>Number</b>
1970	16,414.9	5,152
1971	12,619.3	4,608
1972	16,680.5	4,801
1973	16,664.5	4,040
1974	12,465.6	2,861
1975	11,796.4	2,297
1976	20,029.5	2,276
1977	21,937.1	2,224
1978	34,180.4	2,106
1979	43,535.1	2,128
1980	44,345.7	1,889
1981	82,617.6	2,395
1982	53,754.5	2,346
1983	73,080.5	2,533
1984	122,223.7	2,543
1985	179,767.5	3,001
1986	173,136.9	3,336
1987	173,136.9	2,032
1988	246,875.1	2,258
1989	221,085.1	2,366

Source: Gaughan (2007)

**Fifth Wave (1992-2000)** – In 1992 the number of mergers and acquisitions increased once more as the economy started to recover from the recession. The deals of this period were supported through the increased use of equity, which caused fewer heavily leveraged arrangements.

**Sixth Wave (2002-2006)** – The principal reasons behind this wave were globalization, the rise in commodity prices and the massive growth of private equity funds.

The transactions were motivated by a strategic objective from the buyer company (Gaughan, 2007). This wave is frequently called the globalization wave since it was characterized by the evolution in new technologies and communication (Roberts, Wallace and Moles, 2012).



Table 5 - M&amp;A Transactions (1990-1998)

Year	Number	Value (\$ billions)
1990	2,074	108.2
1991	1,877	71.2
1992	2,574	96.7
1993	2,663	176.4
1994	2,997	226.7
1995	3,510	356.0
1996	5,848	495.0
1997	7,800	657.1
1998	7,809	1,191.8

Source: Gaughan (2007)

History shows that enterprises, which can anticipate great opportunities in the stock market, are rewarded but follower companies can be penalized. This is one of the reasons why it is so important to predict a merger wave. Normally the astute companies pay lower prices for target firms than the ones that merely track their moves (DePamphilis, 2011).

#### 2.2.4. Reasons to Merge and Acquire

There are various reasons why companies decide to merge or acquire another. For Roberts, Wallace and Moles (2012) the motivations behind a merger are determined by series of rationales and drivers.

Brealey & Myers (2003) explain that M&A operations are motivated by potential gains in efficiency from joining operations. Therefore, for these authors the main reasons to merge are:

- Economies of scale: they state that this phenomenon is a goal of horizontal and conglomerate mergers. The companies expect for the chance to divide “...*the fixed costs across a larger volume of output.*” (Brealey and Myers, 2003:573).
- Economies of vertical integration: this type of integration aims to obtain control of a production process through the merge of client and supplier.
- Combining complementary resources: in this case the authors give the example of a small company that has a unique product but does not have the knowledge and the capacity to produce on a large scale. One way to resolve this obstacle is to develop a system that allows production of that product, but that will cost a lot of money for the small company. The other way is to merge with a company that already has those characteristics.

- Merge as a use of surplus funds: as an alternative to the distribution of dividends, the company could invest the surplus of cash in the acquisition of other companies.

For Cameron and Green (2009) the main reasons to merge is growth since “...*merging or acquiring another company provides a quick way of growing...*” (Cameron and Green, 2009: 224), synergy and diversification.

Haleblian, Devers, McNamara, Carpenter and Davison (2009) believe that there are four reasons to merge: value creation, managerial self-interest, environmental factors and firm characteristics.

Gaughan affirms that the most common reason is expansion since for him “...*acquiring a company in a line of business or geographic area into which the company may want to expand can be quicker than internal expansion...*” (Gaughan, 2007: 14).

For Mariana (2012) if firms do not use a merger or acquisition deal, it becomes difficult for them to reach the right size to demonstrate to the financial world that a strategic project can be settled.

## 2.2.5. Synergies

### 2.2.5.1. Introduction

Ray (2010) explains that the concept of synergy is driven from the Greek “*sunergia*” and “*sunergos*” that respectively mean “cooperation” and “working together”. Gaughan states that synergies are a phenomenon where “ $2+2=5$ ” (2007), i.e., the capability of merging companies in order to become more profitable than the single parts of the companies that were merged.

There are two types of synergies: operational and financial (DePamphilis, 2011). This chapter will explain the difference between the two.

### 2.2.5.2. Operational

These types of synergies can be represented through economies of scale (DePamphilis, 2011). Ray (2010) explains that economies of scale are more effective when companies

in the same industry merge because it is possible to eliminate redundant positions. According to DePamphilis (2011) economies of scale are a factor that should be considered in wealth creation for shareholders. Economies of scale occur when an increase in the production of goods can obtain a lower average costs for the company (DePamphilis, 2011).

#### 2.2.5.3. Financial

Financial synergy is observed in the impact that mergers and acquisition have on the cost of capital of the target firm (DePamphilis, 2011). DePamphilis explains that “...*the cost of capital is the minimum return required by the investors and lenders to induce them to buy a firm’s stock or to lend to the firm.*” (DePamphilis, 2011: 5). For Black (1989), this kind of synergy represents the capability of administrators to manage the firm’s capital in a more efficient way than capital markets. There are different ways to achieve financial synergies, Aggoud and Bourgeois (2012) believe that one way is to invest in another business to get a lower systematic risk of portfolio of the firm. Another approach is to increase the dimension of the company in order to access a cheaper capital.

#### 2.2.6. Do Mergers and Acquisitions Payoff?

According to DePamphilis (2011) the payoff of mergers and acquisitions depend on who benefits and over what period. Usually, around the date of the announcement of a merger or acquisition the total shareholder gains are positive. For McNamara, Haleblian and Dykes “...*the peak year showed a greater than 100 percent increase in activity over the first (or base) year, followed by a decline in acquisition activity of greater than 50 percent from the peak year...*” (McNamara, Haleblian and Dykes, 2008:7).

Some empirical studies demonstrate that this kind of deals have been improving operating efficiencies, which leads to a reduction in the price of the products. This is a positive fact for society as explained by DePamphilis (2011).

## **2.3. Valuation Methodology**

### **2.3.1. Introduction to valuation**

For Damodaran (1994) one of the most important requirements of decision making when choosing a portfolio to invest in or a fair value to pay in a takeover, is to know the value of an asset and what determines that value. However, some assets are more difficult to value than others since the details of valuation and valuation estimates can be different.

Perez and Famá (2003) explain that when evaluating a company, it is fundamental to reach a fair economic value, i.e., a value that represents in a balanced way, the potential and the future perspectives of the company. According to Perez and Famá (2003), the quality of the valuation is directly proportional to the quality of the data and information of the company evaluated.

The difference between value and price is an important matter to understand the process of company valuation. Perez and Famá (2003) say that the value is the reflection of its utility to the evaluator. For these authors the price is defined through the wishes of the buyer and expectations of the seller. Therefore, while the value is subjective and dependent on several factors, the price is exact and precise.

### **2.3.2. Valuation Methods**

There are three approaches to value a company. Discounted cash-flow, relative valuation and contingent claim valuation, known as real option (Damodaran, 1994).

This review of literature will focus only on the first two approaches.

#### **2.3.2.1. Discounted Cash Flows**

The goal of this method is to estimate the cash flows that the company is going to generate in the future (Free Cash Flows) and then discounting them with an appropriate discount rate (Fernandez, 2013). The Discounted Cash Flows approach has an enormous variety of applications, including valuation of mergers and acquisitions. In this type of valuation the Free Cash Flows are projected for a defined period, given the difficulties in accurately projecting the cash flows over a long period of time. The terminal value is used to estimate the remaining value of the cash flows beyond the projection period. The present value of the free cash flows and the terminal value are added in order to obtain the enterprise value,

which is the fundamental base for the Discounted Cash Flows valuation (Rosenbaum and Pearl, 2009).

There are two different approaches to calculate the discounted cash flow: firm valuation or equity valuation.

#### 2.3.2.1.1. Free Cash Flow to Firm

The FCFF comprises the sum of cash flows generated by the firm that can be distributed to the shareholders and bondholders of the company. Damodaran emphasizes that “...*the cash flow to the firm should be after taxes and all reinvestment needs have been met...*” (Damodaran, 2001: 751). The FCFF is computed by the following formula:

$$\text{FCFF} = \text{EBIT} (1 - \text{tax rate}) + \text{D\&A} - \text{CAPEX} - \Delta \text{ Working Capital} \quad (1)$$

The weighted average cost of capital is the “*weighted average of the costs of the different components of financing used by a firm*” (Damodaran, 1994: 37) and is given by the following formula:

$$\text{WACC} = \frac{E}{(D + E)} \times R_E + \frac{D}{(D + E)} \times R_D \times (1 - t) \quad (2)$$

Where:

- E is the market value of the firm’s equity
- D is the market value of the firm’s debt
- $R_E$  is the cost of equity
- $R_D$  is the cost of debt
- T is the tax rate

If the firm’s cash flows are growing at a stable rate, it is possible to estimate the FCFF using the WACC as a discount rate (Damodaran, 1994). If this assumption is taken into consideration, the firm value can be expressed as:

$$\text{Value of firm} = \frac{\text{FCFF}_1}{(\text{WACC} - g_n)} \quad (3)$$

The general formula of the value of the firm can be shown as:

$$\text{Value of firm} = \sum_{t=1}^{t=\infty} \frac{\text{FCFF}_t}{(1 + \text{WACC})^t} \quad (4)$$

In the case of the company, after  $n$  years, it starts to grow at a stable rate. The value of the firm can be measured as follows:

$$\text{Value of firm} = \sum_{t=1}^{t=n} \frac{\text{FCFF}_t}{(1 + \text{WACC})^t} + \frac{\text{FCFF}_{n+1}}{(1 + \text{WACC})^n} \quad (5)$$

#### 2.3.2.1.2. Free Cash Flow to Equity

The free cash flow to equity is the cash flow that is left to the firm's shareholders after meeting all company obligations (Damodaran, 1994). Through this method it is possible to price the value of the company by discounting the FCFE at the cost of equity ( $R_E$ ). The FCFE is given by the following formula:

$$\text{FCFE} = \text{Net Income} + \text{D\&A} - \text{Capital Spending} - \Delta \text{Working Capital} - \text{Principal Repayments} + \text{New Debt Issues} \quad (6)$$

Or,

$$\text{FCFE} = \text{FCFF} - \text{Interest Expense} \times (1 - t) + \Delta \text{Debt} \quad (7)$$

Regarding growth assumptions there are some models for valuing equity. In order to value equity of a company that is growing at a stable rate it is possible to use the perpetual growth equation (Damodaran, 2001):

$$\text{Value of Equity} = \frac{\text{FCFE}_1}{(R_e - g_n)} \quad (8)$$

For cases in which the cash flows are growing at a rate higher than the economy's rate the value of equity should be computed in two stages. The first phase “...is the present value of the free cash flows to equity during the high-growth phase, and the second part is the present value of the terminal value of equity.” (Damodaran, 2001:132).

$$\text{Value of Equity} = \sum_{t=1}^{t=n} \frac{\text{FCFE}_t}{(1 + R_e)^t} + \frac{\text{FCFE}_n}{(1 + R_e)^n} \quad (9)$$

### 1.3.2.1.3. Discount Rates

Damodaran (2001) explains that the expected cash flows must be discounted at a rate that is similar to the cost of funding those assets. In this chapter we are going to explain the differences between the cost of equity and cost of debt.

#### Cost of Equity

The cost of equity is the rate of return that investors need to create an equity investment. There are two methods to compute the cost of equity, the first one is based on the CAPM model and the second is to use a dividend-growth model (Damodaran, 1994). In this chapter we are going to focus only on the first one.

#### *CAPM – Capital Asset Pricing Model*

The CAPM estimates “...the risk in terms of non-diversifiable variance and relates expected return to this risk measure.” (Damodaran, 1994:20-21). According to Sharpe (1964), through a diversified portfolio it is possible to avoid part of the inherent risk of an asset.

Regarding CAPM, the cost of equity ( $R_e$ ) can be expressed as:

$$R_e = R_f + \beta(R_m - R_f) \quad (10)$$

Where:

- $R_f$  is the risk-free rate, i.e., interest rate available on a risk-free bond
- $R_m$  is the expected return on the market index
- $(R_m - R_f)$  is the market risk premium
- $\beta$  is the relative risk of a specific asset

#### Cost of Debt

Damodaran (1994) describes that the cost of debt estimates the current cost of borrowing capital to funding projects. This discount rate is the average interest rate at which the firm was capable of financing over the previous years. The cost of debt is given by the following formula:

$$R_d = \frac{\text{Interest Expense}}{\text{Debt}} \quad (11)$$

### 2.3.2.2. Relative Valuation

In relative valuation the main goal is to evaluate an asset by taking into account the price of similar assets in the market (Damodaran, 2001). In order to do so, it is necessary to standardize the values. *“They can be standardized relative to the earnings they generate, to the book value or replacement value of the assets themselves, or to the revenues they generate...”* (Damodaran, 2001:775).

The most popular multiples for an equity approach are:

- Price/earnings ratio
- Price/book value
- Price/sales ratio

For a firm approach, the best known multiples are:

- Enterprise value/revenues
- Enterprise value/invested capital
- Enterprise value/EBITDA

The advantage of multiples is that they are simple and can be used to obtain estimates of firm value. However, using multiples based on comparable companies may be misleading as these firms may be overvalued or undervalued themselves (Damodaran, 1994).

### Comparable Companies

These types of analysis are some of the primary methodologies used for valuing a given company or business. For Rosenbaum and Pearl *“...it provides a market benchmark against which a banker can establish valuation for a private company or analyze the value of a public company at a given point in time...”* (Rosenbaum and Pearl, 2009:11). Comparable companies’ analysis has an extensive range of applications like mergers and acquisitions processes, initial public offers, restructurings and investment operations (Rosenbaum and Pearl, 2009).



### 3. Facebook

#### 3.1. Company Description

*“Facebook’s mission is to give people the power to build community and bring the world closer together. People use Facebook to stay connected with friends and family, to discover what’s going on in the world, and to share and express what matters to them.”*

*Facebook Mission*

Facebook is a social network that allows its individual and organizational users to share and communicate through mobile devices and computers. Boyd and Ellison (2007) explain that a social network is a web-based service that enables its users to create a public or semi-public profile inside a restricted system and to make a list of other users with whom they want to share a connection.

The main priority for Facebook is to create useful products that facilitate people to connect with their friends through different platforms. The best known products of this company are:

- Instagram: is a platform where people can take photos or videos and use the application’s filters to customize and share them with the followers;
- WhatsApp: is a messaging application for smartphones and tablets. By staying connected via the internet, it is possible for users to send messages, videos, photos or audio to their friends;
- Facebook: as previously mentioned, is a social network that enables the users to create profiles and interact with their friends;
- Facebook Messenger: is an instant message application where users can send messages, make voice or video calls, share location and send documents and pictures.

The significant majority of Facebook’s revenue come from third-party advertising on their platforms.

According to the Annual Report on 31<sup>th</sup> December 2016, Facebook had 17,048 employees.

### **3.2. Historical Review**

Facebook was founded on 4<sup>th</sup> February 2004 by Mark Zuckerberg along with his college friends from Harvard University - Dustin Moskovitz, Chris Hughes and Eduardo Saverin.

Firstly, the website was launched as “The Facebook” and the membership was limited to Harvard Students. One month later, the growth was huge and Facebook expanded to three other universities: Yale, Columbia and Stanford.

In September 2004, “Facebook Wall” was launch the where users post messages to their friends.

In 2005, “The Facebook” formally drops the “the” and becomes Facebook.

In September 2006 the social network was extended beyond universities and high schools, so that everyone older than 13 year with an e-mail address could create an account. The registration was free and the company’s revenues came from advertising only.

In 2008, Facebook created the chat application where people could have private chats with their friends in real time. Subsequently a year later the “like button” was released. Once this button is used, the called “liked content” appears in the Feed of that user’s friends.

In 2010, Facebook reached 600 million of active users.

In 2012, Facebook acquired the social network Instagram for \$1 billion in cash and stock.

On 18<sup>th</sup> May 2012 Facebook announced the pricing of Initial Public Offer of 421,233,615 shares at a price of \$38 per share.

On 19<sup>th</sup> February 2014 Facebook acquired WhatsApp for \$19 billion.

Facebook reached 1 billion of active users per day back in 2015 and 400 million users on Instagram every month.

In 2016, the live video function was launched on Facebook, where users can share and interact with other users in real time. In the same year Facebook Messenger reaches 1 billion users per day.

### **3.3. Main Competitors**

There is a wide variety of social networks, each one has its own uniqueness. Some aimed to share professional skills and connect with recruiters, others simply serve to share the daily events of people's live. In conclusion, Facebook has several competitors such as:

- **LinkedIn:** a social network for professionals, the main goal of the application is for recruiters to find potential candidates and for candidates to find new jobs. In their profile page, users can describe their professional skills, and list their employment and academic history. LinkedIn was acquired by Microsoft in 2016 but was initially launched in March 2006.
- **Snapchat:** a mobile application where users can send photographs and videos to selected friends. Those photographs and videos can be seen for 10 seconds only before disappearing. After a few years, Snapchat introduced “My Story” where users could share images or videos to all of their friends for 24 hours. In the past years, Snapchat is becoming unpopular since Instagram launched “Insta Stories” which are similar to Snapchat’s “My Story”. This event occurred after Facebook tried to buy Snapchat but without success. The initial release was in September 2011.
- **Pinterest:** an online visual discovery tool where users can share images, content or designs and categorize them as per their personal interests. It is possible for users to interact through comments, likes and repining (sharing content). Pinterest was launched in March 2010.
- **Google +:** a social network where users need a Google account to sign in. This platform is similar to other social networks since is possible to share pictures and any other type of content. Google + users can create circles like work circle or friends circle. This way, they can share content within a specific circle. This platform also has video chat and instant messaging named Hangouts.
- **Twitter:** a social network that allows users to share short posts called tweets which are restricted to 140 characters. Tweets and replies to tweets can be sent by text message or by posting on the platform. Anyone, user or not, can search for tweets but only users can post them. It was created back in March 2006.

- Sina Weibo: one of the most famous social networks in China. It was released in 2009 by Sina Corporation. This website allows its users to post messages with 140 character limit, communicate with other users and follow people so that their posts appear on the user's timeline. Since this social network is Chinese, there are several mechanisms of censorship of certain publications made by users, for example, some posts that are related to sensitive political issues will be removed.

## **4. WhatsApp**

### **4.1. Company Description**

WhatsApp is a mobile messaging company. This platform permits users to send limitless text messages, videos, audio, photos and gifs, the only thing that is necessary is to have access to the internet. The application includes a feature named “Status” where users can upload photos and videos for 24 hours like Snapchat, Instagram and Facebook.

Until 18<sup>th</sup> January 2016, the revenue from WhatsApp came from a subscription fee, in some countries it cost \$1 per year and in others, the first year was free and subsequently, users would pay a yearly subscription of \$1. After this announcement, it was reported that the company would not use third-party advertising to replace the annual fees that were charged to users.

In 2016, WhatsApp began testing a tool that allowed users to communicate with companies to get information, such as banks or airlines, without users being disturbed with spam or advertising.

### **4.2. Historical Review**

In September 2007, Jan Koum and Brian Acton, founders of WhatsApp, quit their jobs at Yahoo and both applied for jobs at Facebook but were rejected. The engineers soon realized that Apple Store would soon create an industry for mobile applications.

In February 2009, WhatsApp Inc. was launched in California, the name was chosen to sound like “What’s up”. Initially, the application was only available in the Apple Store but a few months later also became accessible on BlackBerry. After some time, the application became paid which cost \$1 a year in some countries and in others, the first year was free and subsequently, users would pay a yearly subscription of \$1.

In December 2009 WhatsApp added the feature to send photos through the app but only for iPhone. In 2011, WhatsApp reached the top 20 on the U.S. Apple Store. After a couple of years, the number of monthly users had grown to 400 million.

On 19<sup>th</sup> February 2014, Facebook confirmed that it had acquired WhatsApp for \$19 billion, of which \$12 billion was paid in Facebook stock shares, \$4 billion in cash and \$3 billion in Facebook restricted stock units.

In 2015 WhatsApp reached the 900 million users.

In 2016 Jan Koum announced that the application would become free. Additionally, he explained that the app would not have third party advertisement and instead, they would develop a new tool where users can make contact directly with certain companies.

### **4.3.Main Competitors**

Considering the globalization that we live in today, there is an increasing need for people to be in constant contact in a simple and cheap way. Thus, there is a wide range of applications for instant messaging. Although WhatsApp is one with the largest number of users, there are several applications that compete with it, the main ones are:

- Viber: is a free communication platform and is available for all kinds of phones and computers with access to internet. This application is very similar to WhatsApp since users can send messages, videos, gifs and make audio and video calls. The original authors are Viber Media but it was acquired by the Japanese company Rakuten Inc.
- Skype: this platform is well known for the quality of audio and video calls but also has an instant messaging tool. It is available for iOS, Android, Windows and BlackBerry. Like their competitors, it allows users to send pictures, videos and group messages. The company that own the application is Skype Technologies.
- Google Hangouts: a messaging platform that allows its users to send text messages, voice notes, video calls or create group conversations. In order to use this application, it is necessary to have a Google email account. It is available for all types of mobile devices and computers.
- Line: this app is similar to the others since it lets its users send text, audio and video messages, as well as make phone calls through the internet. This application is compatible with all kinds of computers and mobile phones. Line has another

feature similar to “Timeline” where people can see any status updates and a unique one that allows its users to make international calls to non-line users.

- WeChat: also known by “Weixin” in China is a mobile application that allows its users to send free text messages, videos and voice messages. It is the most popular instant messaging in China and is available on Android, iOS, BlackBerry and Windows phone platforms. It was launched in January 2011.

## 5. Acquisition Process: Pros and Cons

### 5.1. Reasons to Acquire WhatsApp

On 19<sup>th</sup> February 2014, WhatsApp was acquired by Facebook. This transaction was considered one of the biggest in the technology market history since Facebook paid \$19 billion (\$3 billion in restricted stock units, \$4 billion in cash and \$12 billion in Facebook shares) for it.

After Mark Zuckerberg announced the acquisition agreement, many felt that the price paid was excessive so people started to speculate on how the company would benefit from this operation. This chapter will explain some of the reasons that motivated the Facebook CEO to acquire WhatsApp.

#### 5.1.1. Younger Audience

Over the years, Facebook has lost some of the younger users to other social networks like Snapchat, Instagram and WhatsApp. WhatsApp has become an essential tool for daily communication and has increasingly attracted the younger layers. In this way, if Facebook maintains this young spirit and makes constant innovations to this message application they could potential win over young teens who have chosen to use other social networks.

#### 5.1.2. Mobile Communication

One of the main focuses of Facebook is mobile communication thus WhatsApp is the right partner to help Facebook accomplish their goals since this instant messaging platform is substituting the SMS communication and is one of the most popular among the technology users. According to the press release made on Facebook's News Room, WhatsApp will enable *"Facebook's ability to bring connectivity to the world"*.

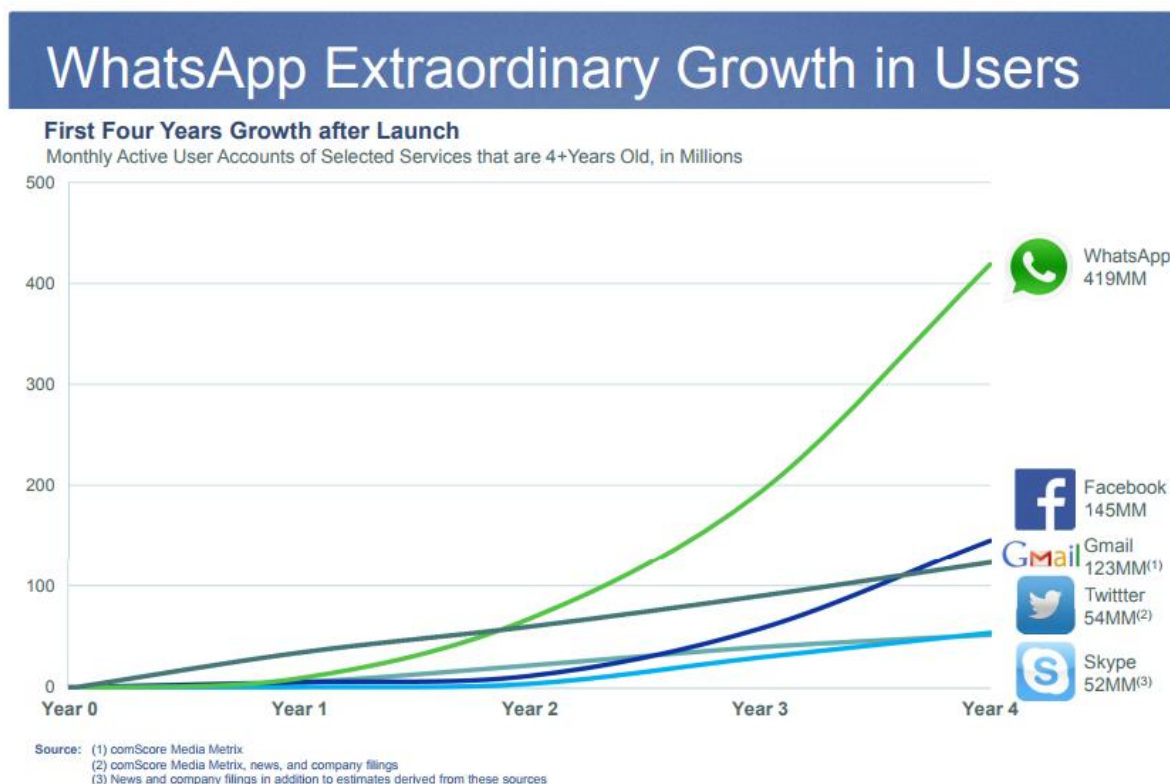
#### 5.1.3. User Engagement

WhatsApp is well known for high rates of engagement. During a conference call Mark Zuckerberg said that *"WhatsApp is the only widely used app we have ever seen that has more engagement and a higher percent of people using it daily than Facebook itself"*. (2014). According to the information available on the WhatsApp blog, it is possible to see that in 2017 there were 1 billion daily active users, 1.3 billion monthly active users, 55 billion messages sent every day and that the application is supported in 60 languages.

### 5.1.4. WhatsApp Growth

From the chart below it can be seen that compared to the main social networks, WhatsApp was the one that grew the most in the first 4 years of existence. This statistic enforces the idea that WhatsApp can quickly exceed the number of users of various social networks.

Figure 1 – Social Networks Growth



Source: Facebook

### 5.2. Disadvantages of the Acquisition

In the previous chapter, we looked at some of the advantages and reasons that led Facebook to acquire WhatsApp but many experts believe that this will not have been the best strategy for the future of Mark Zuckerberg's company. Regarding this deal, the Principal Analyst at Enderle Group told CNBC that *“I think they massively overpaid for this. They have done it because they are desperate. They are so worried that they are bleeding users that they are trying to get their user count up by buying companies that have users.”* (2014). Therefore, in this chapter we will examine some of the disadvantages of this operation.



### 5.2.1. Advertising

Facebook and WhatsApp have different business models. While for the former the main source of revenue is the advertising arranged on the website, the latter does not use this type of strategy. Consequently, for WhatsApp to remain loyal to its ideologies, revenue growth prospects may not be as high as expected so it will be important to find other sources of revenue. If WhatsApp chooses to introduce advertising into the application, it may lose a lot of users.

### 5.2.2. Privacy of Users

Many experts are concerned about the privacy of WhatsApp users. After the acquisition operation, Facebook will have access to the information of WhatsApp users. Although both companies explained that they would operate separately, Facebook could use this type of information for advertising purposes. The Electronic Privacy Information and the Center for Digital Democracy said to BBC that “Users provided detailed personal information to the company including private text to close friends. Facebook routinely makes use of user information for advertising purposes and has made clear that it intends to incorporate the data of WhatsApp users into the user profiling business model. The proposed acquisition will therefore violate WhatsApp users' understanding of their exposure to online advertising and constitutes an unfair and deceptive trade practice, subject to investigation by the Federal Trade Commission.” (2014).

### 5.2.3. Facebook Stocks Fell

On 19th February 2014 Facebook announced that it had acquired WhatsApp for \$19 billion. Shortly after this announcement Facebook's share price fell 5%. This event may be related to the fact that many investors consider that the price paid by Facebook was excessive.

## **6. WhatsApp Valuation**

### **6.1. WhatsApp Financial Statements Overview**

#### **6.1.1. Balance Sheet**

At the time of acquisition WhatsApp was in a typical small cap company situation, i.e. a company with high growth potential with small market capitalization.

Considering the balance sheet (see Appendix 1) this presents a total assets of \$50,786,000; \$60,049,000 of which comes from liabilities and negative capital amounting to \$9,263,000. Analyzing the asset, it is possible to conclude that the most significant account is cash amounting to \$45,542,000 which represents about 90% of the asset. It may seem unusual for a company to present negative equity and have a high amount of cash, however this is explained by the fact that WhatsApp functions as a prepaid service, meaning it receives the value of the service even before it has been provided.

Regarding the liabilities, there is an amount of \$49,376,000 that represents the deferred revenue. These amounts refer to the subscription fee that is received in advance by the users, i.e. after downloading the application or, in some cases, a year after doing so users have to pay an annual fee. This way the company will have to register the deferral related to this responsibility. As explained above, this deferral is a consequence of WhatsApp activity and will be recognized in the income statement when the service is provided to customers.

The equity presents many variations, with the capital increase in the amount of \$49,802,000 and the conversion of dividends to be paid in the amount of \$362,229,000. Through the balance sheet it is possible to conclude that the equity has a negative value, which is justified by the fact that the deferred income has not yet been transferred to retained earnings. In addition, we have verified that WhatsApp does not have financial loans, so it is financed through capital.

#### **6.1.2. Income Statement**

WhatsApp is a company that is in the growth phase so its cost structure is quite high. The items that most contribute to this situation are cost of revenue and research and development (see Appendix 1).

We have verified that all research and development expenses incurred in the application are being recognized in the income statement; however, no amount is being considered as intangible assets. The main costs which are being registered in this account are related to the salaries of the engineers and technicians who are responsible for the creation, development and testing of new features for WhatsApp as well as the improvement of existing features.

In the cost of revenues, these are considered as expenses such as distribution of messaging service, infrastructure costs, and payment processing fees, among others. It is natural that at the start of the operation, the cost of revenue is higher than revenue alone because the market is characterized by economies of scale, i.e., the positive increase of an application user will not generate an expense in the same proportion, since there are several fixed costs in the operation. Thus, it is expected that in the initial years WhatsApp will present negative results until entering the phase of steady state.

## **6.2. Limitations**

Like in other valuations there are some limitations that need to be explained. However, these limitations are not significant and will not distort the results and conclusions of this thesis.

WhatsApp is not a listed company therefore the reliable information available is limited. There is only financial data available for 2012 and 2013. In these years, WhatsApp was in an exponential growth phase, so there will be a need to adjust the growth rates among the different financial statement line items. Another limitation comes from the fact that WhatsApp is not a listed company. It was necessary to consider some assumptions in order to compute the valuation. Given that there were no historical prices available to compute the discount rates there was a need to use comparable companies.

WhatsApp is part of the social media sector, which, as a new industry, has few listed companies so the information about comparable companies is very limited. The assumptions considered for the accomplishment of this work were based solely on two companies: Facebook and Twitter.

### 6.3. Main Assumptions

#### 6.3.1. Horizon Plan and Steady State

Considering that the acquisition of WhatsApp occurred in February 2014, we are going to take into account the financial statements of WhatsApp of 2012 to 2013, in order to do this valuation. Based on this data, projections were made for the years 2014 to 2020 and this last year was considered as the steady state.

It was assumed that the perpetuity growth rate is 3% since we consider it reasonable to assume a value similar to the inflation rate recorded in the United States.

#### 6.3.2. Cost of Equity

The cost of equity represents the rate of return required by the shareholders for their investment in a certain company. In order to compute the cost of equity, it is necessary to define the risk-free rate, beta and market risk premium.

The risk-free rate is the rate of return for a given investment with no risk associated. In cases where the projects have some risk, the rate of return increases and remunerate the risk of the investor. The rates of return that most closely resemble the risk-free rate are treasury government bonds as they have a reduced level of risk. For this project, we chose the 10-year United States Treasury Bonds since it has a triple A rating according to Standard & Poor's. The length we define was 10 years since we are valuing a long term investment. Therefore, the 10-year US Treasury Bonds on 31<sup>st</sup> December 2013 finished up with a yield of 2.69%.

The  $\beta_U$  represents the volatility of returns of a company without debt within market. Usually, the beta is calculated through a linear regression between stock price and market return. However, since WhatsApp is not a listed company, it is not achievable to follow this path. So, in order to calculate this variable we use the beta of comparable companies with historical data from 2013.

**Table 6 - Beta Unlevered Computation**

<b>Company</b>	<b><math>\beta_u</math></b>
Facebook	1.0496
Twitter	0.8380
<b><i>Average</i></b>	<b><i>0.9438</i></b>

WhatsApp has no debt since the company is financed exclusively by equity. We consider this to be common in an early-stage company. However, we believe that this capital structure will not be maintained in the future. Therefore, from the year 2020 (steady state) we assumed Twitter's debt and the cost of debt. In order to calculate the cost of equity we need to use Beta Unlevered until 2019 and Beta Levered in 2020. See the Following formula:

$$B_L = \beta_U \times \left[ 1 + (1 - t) \times \frac{D}{E} \right] \quad (12)$$

Taking formula (12) in consideration it is possible to conclude that the beta levered is 1.0357.

The market risk premium is the difference between the expected return on an investment and the risk-free rate. In the case of the WhatsApp valuation, we used the market risk premium of 4.62%, according to Damodaran's Historical Returns: Stocks, Treasury Bonds & Treasury Bills with Premiums.

Finally, with the above mentioned it is possible to conclude that the cost of equity is 7.00%

$$R_{e\ 2014-2019} = 2.69\% + 0.9438 \times 4.62\% = 7.05\% \quad (13)$$

$$R_{e\ 2020} = 2.69\% + 1.0357 \times 4.62\% = 7.48\% \quad (14)$$

### 6.3.3. Cost of Debt

The cost of debt represents the returns that a firm offers to its debt holders.

As explained before, WhatsApp has no debt, thus in order to compute its cost of debt it was assumed the capital structure of a similar company (Twitter) and applied that amount of debt in the steady state. Through the annual report of Twitter in 2013 the value of the debt is \$416,234,000. Therefore, we assume that from the year 2020 (steady state) WhatsApp would have this amount of debt. Additionally, it was found that Twitter has an interest expense of \$6,860,000 and a total obligation of \$197,646,000. Applying the formula (11) is possible to conclude that the cost of debt is:

$$R_d = \frac{6,860,000}{197,646,000} = 3.47\% \quad (15)$$

### 6.3.4. Cost of Capital

The Weighted Average Cost of Capital - WACC is used to compute the FCFE and represents the rate that a firm expects to pay on average to all its investors to finance its assets. As explained in the previous point, WhatsApp has no debt, however from the year 2020 (steady state) we assumed Twitter's debt and the cost of debt. Thus, the same assumption will be applied for the WACC calculation.

**Table 7 - WACC Computation in thousands**

	2014	2015	2016	2017	2018	2019	2020
R <sub>e</sub>	7.05%	7.05%	7.05%	7.05%	7.05%	7.05%	7.48%
R <sub>d</sub>							3.47%
Equity	9,263	9,263	9,263	9,263	9,263	9,263	2,950,006
Debt							416,234
Taxes	35%	35%	35%	35%	35%	35%	35%
<b>WACC</b>	<b>7.05%</b>	<b>7.05%</b>	<b>7.05%</b>	<b>7.05%</b>	<b>7.05%</b>	<b>7.05%</b>	<b>6.83%</b>

$$\text{WACC} = \frac{9,263}{9,263} \times 7.05\% + \frac{0}{9,263} \times 0 \times (1 - 35\%) = 7.05\% = R_e \quad (16)$$

$$\text{WACC} = \frac{2,950,006}{2,950,006 + 416,234} \times 7.48\% + \frac{416,234}{2,950,006} \times 3.47\% \times (1 - 35\%) = 6.83\% \quad (17)$$

The WACC was computed using formula (2) therefore, between 2014 and 2019 the WACC is 7.05% since there is no debt the WACC is equal to cost of equity (see formula 16). In the steady state the WACC is 6.83% (see formula 17).

### 6.3.5. Return on Sales

Return on sales is a ratio used to measure the efficiency of an entity to generate profit from its revenues.

For the case of WhatsApp, we initially calculate the value of ROS considering the data available from the annual report of 2013. See the table below for this computation.

**Table 8 - ROS Computation: WhatsApp**

	2013
Revenue	10,210
Cost of Revenue	52,867
<b>Research and Development</b>	76,911
<b>General and Administrative</b>	18,870
Sales and Marketing	30
Total Costs	148,678
<b>EBIT</b>	<b>-138,468</b>
<b>Cash Flow Margin = EBIT/Sales - ROS</b>	<b>-1.356%</b>

Table 8 shows that the ROS of WhatsApp in the year 2013 is -1.356%. This negative value is justified by the fact that WhatsApp has a very high cost structure since the company is in a growth phase. However, we believe that it will not be reasonable to assume this growth of ROS on a constant steadily. Thus, it was assumed that for the steady state WhatsApp would have a ROS equal to Facebook in 2013. Through the annual report of Facebook in 2013 we selected the necessary information for the calculation of ROS, see the table below.

**Table 9 – Facebook ROS Computation**

	Facebook - Annual Report 2013
Revenues	7,872
Cost of Revenue	1,875
Research and Development	1,415
General and Administrative	781
Sales and Marketing	997
EBIT	2,804
<b>Cash Flow Margin = EBIT/Sales - ROS</b>	<b>35.62%</b>

This way it will be assumed that the ROS will steadily increase until it reaches 35.62% in 2020 (steady state).

**Table 10 - ROS Growth**

	2013	2014	2015	2016	2017	2018	2019	2020
<b>ROS</b>	-1356.20%	-641.06%	-250.72%	-80.96%	-5.33%	28.34%	40.47%	35.62%

### 6.3.6. Net Working Capital Needs

Working Capital is a financial ratio that indicates if a company has operating liquidity available to continue its business. That measure shows if an entity has sufficient current assets to cover its current debt.

The variation of Net Working Capital Needs is one of the variables considered in the FCFF calculation. In order to compute the Working Capital Needs of WhatsApp, we used the information of the financial statements of 2013. The operating current assets are given by the accounts receivable. The operating liabilities are the sum of accounts payable and the deferred revenue. The deferred revenue is being considered since it represent a service that has not yet been provided but has already been paid. Therefore, this is one of WhatsApp’s responsibilities.

**Table 11 - Working Capital in thousands**

	2012	2013
Operating Current Assets	2,161	2
Operating Current Liabilities	-1,570	-9,793
<b>Net Working Capital Needs</b>	<b>591</b>	<b>-9,791</b>

In order to standardize this variable we divided the WC by the sales of 2012 and 2013 and we found the average between these years.

**Table 12 - NWCN/ Revenue Ratio**

	2012	2013	Average
Net Working Capital Needs / Revenue	15.47%	-95.90%	-40.21%

As can be seen from Table 11 and Table 12, the NWCN is negative. This situation is characteristic of companies with very specific businesses that in most of their services receive a prompt payment, which results in a low value of accounts receivable.

In the case of WhatsApp, this situation is due to the subscription fees that are charged before the service is provided by the company hence, we can consider it as a prompt payment. We believe it would not be reasonable to consider this negative level of NWCN in perpetuity since the valuation may be biased. Through the information available on the Damodaran’s website, it can be verified the NWCN/revenue ratio for the internet software



industry which will be 9.86%. We assumed that the 9.86% would be the amount of the NWCN/Revenue in the steady state. The first year will have a NWCN / Revenue ratio of -40.21% as shown in table 12 and it will grow steadily until it reaches 9.86% in perpetuity. Finally, we will multiply this ratio by sales in order to find the amount of NWCN.

**Table 13 - Net Working Capital Needs Computation**

	2014	2015	2016	2017	2018	2019	2020
NWCN/ Revenue	-40.21%	-31.87%	-23.52%	-15.18%	-6.83%	1.51%	9.86%
Revenue	27,282	72,899	170,851	344,307	580,787	788,950	812,619
<b>NWCN</b>	<b>-10,971</b>	<b>-23,232</b>	<b>-40,189</b>	<b>-52,256</b>	<b>-39,677</b>	<b>11,947</b>	<b>80,124</b>

## 6.4. Discounted Cash Flow Valuation

### 6.4.1. FCFF Approach

FCFF is one of the most common evaluation methods. This indicator represents cash available to all investors after all expenses and reinvestments.

In order to evaluate WhatsApp we will calculate the FCFF amount and discount it at an appropriate discount rate, i.e., the WACC. To calculate the FCFF, it will be used the following formula:

$$\text{FCFF} = \text{EBIT}(1 - t) + \text{D\&A} - \text{CAPEX} - \Delta\text{WC} \quad (18)$$

Regarding the EBIT (1-t) it is given by the following formula:

$$\text{EBIT}(1 - t) = \text{Operating Revenue} \times \text{Return on Sales After Taxes} \quad (19)$$

The revenue of WhatsApp increased by 167% from 2012 to 2013. It was considered that this growth rate would be maintained until 2015. From this year it was assumed that the revenue would decrease steadily until it reached a g of 3% in 2020 (steady state). See the table below:

**Table 14 – Revenue Growth in thousands**

	2013	2014	2015	2016	2017	2018	2019	2020
Revenues	10,210	27,282	72,899	170,851	344,307	580,787	788,950	812,619
<i>g Sales</i>	167%	167%	167%	134%	102%	69%	36%	3%

The second part of formula (19) corresponds to ROS. This is calculated using the following formula:

$$\text{ROS} = \frac{\text{EBIT}}{\text{Operating Revenues}} \quad (20)$$

As explained in chapter 6.3.5., it was assumed that for the steady state WhatsApp would have a ROS equal to Facebook. Table 10 shows the values that are going to be considered for the analysis.

In relation to Capex, this represents an investment of Fixed Assets. Based on the analysis of the financial statements we concluded that fixed assets have a low value since the WhatsApp operation is based on the development of a communications application, thus not requiring high investments in this field.

Fixed assets are essentially composed by basic and administrative equipment. Therefore, it is not reasonable to assume a constant decrease up to a value defined in steady state because, in addition to the investment value in percentage terms on sales already being low, it will not fluctuate significantly during this period.

The Fixed Assets/Revenue ratio was computed for 2012 and 2013. See the table below.

**Table 15 - Fixed Assets/ Sales**

	2012	2013	Average
Fixed assets/Revenues	4.87%	2.75%	3.81%

Subsequently, in order to include the above mentioned assumption, the average of these amounts was calculated and multiplied by the forecast sales. The impact of this amount on the FCFE is the variation in fixed assets. See the table below for the computed amounts.

**Table 16 - Net Capex Computation in thousands**

	2014	2015	2016	2017	2018	2019	2020
(1) Revenues	27,282	72,899	170,851	344,307	580,787	788,950	812,619
(2) Fixed Assets = (1) x (3)	1,039	2,777	6,509	13,118	22,128	30,059	30,961
(3) Fixed Assets/Revenues	3.81%	3.81%	3.81%	3.81%	3.81%	3.81%	3.81%
(4) Δ Fixed Assets (Net Capex)	758	1,738	3,732	6,609	9,010	7,931	902

With all the above mentioned it is possible to compute the FCFF. See the table below:

**Table 17 - FCFF Computation in thousands**

	2014	2015	2016	2017	2018	2019	2020
(1) EBIT(1-t)	-113,681	-118,804	-89,909	-11,936	107,002	207,534	188,145
(2) Δ NWCN	-1,180	-12,261	-16,957	-12,067	12,580	51,623	68,178
(3) Δ Fixed Assets (Net Capex)	758	1,738	3,732	6,609	9,010	7,931	902
<b>FCFF = (1)-(2)-(3)</b>	<b>-113,259</b>	<b>-108,281</b>	<b>-76,683</b>	<b>-6,478</b>	<b>85,412</b>	<b>147,980</b>	<b>119,066</b>

After calculating the FCFF, these were discounted at an appropriate discount rate, in this case the WACC, see the assumption defined for the WACC calculation in chapter 6.3.4.

It was assumed that after 2020 WhatsApp will grow in perpetuity at a steady rate of 3%. According to formula (5) the enterprise value is \$1,981,410,000, see the table below.

**Table 18 - Enterprise Value in thousands**

<b>Terminal Value</b>	3,106,843
<b>Discounted Terminal Value</b>	2,089,787
<b>Enterprise Value</b>	1,981,410

#### 6.4.2. FCFE Approach

The FCFE is a metric used to measure the amount of cash that can be distributed to the shareholders after all reinvestment needs, debt and expenses are paid. The FCFE can be computed through the equation below:

$$\text{FCFE} = \text{FCFF} - \text{Interest Expense} \times (1 - t) + \Delta \text{Debt} \quad (21)$$

The first part of the equation (21) has already been calculated in the previous chapter, see table 17. Regarding Interest Expense, it has been explained previously (6.3.3.) that WhatsApp has no debt since it is financed exclusively from equity. However, it was considered that it will not be reasonable to presume this assumption in the steady state. Along these lines, it was assumed that WhatsApp's interest expense in the steady state would be equal to Twitter in 2013, that is, \$6,860,000 according to the annual report of 2013. The debt to consider in the FCFE calculation is the same as Twitter's (according to the same annual report) as explained in section 6.3.4.

Table 19 - FCFE in thousands

	2014	2015	2016	2017	2018	2019	2020
(1) FCFF	-113,259	-108,281	-76,683	-6,478	85,412	147,980	119,066
(2) Interest Expense AT	-	-	-	-	-	-	4,459
(3) Variation of Debt	-	-	-	-	-	-	416,234
<b>FCFE = (1)-(2)+(3)</b>	<b>-113,259</b>	<b>-102,281</b>	<b>-76,683</b>	<b>-6,478</b>	<b>85,412</b>	<b>147,980</b>	<b>530,841</b>

Likewise, in FCFF, it will be necessary to calculate the discounted FCFE. However, in this case, the discount rate used will be the Cost of Equity ( $R_E$ ). This rate of return was previously determined in section 6.3.2. See the discounted FCFE computation on the table below:

Table 20 - Discounted FCFE in thousands

	2014	2015	2016	2017	2018	2019	2020
FCFE	-113,259	-102,281	-76,683	-6,478	85,412	147,980	530,841
$R_e$	7.05%	7.05%	7.05%	7.05%	7.05%	7.05%	7.48%
<b>Discounted FCFE</b>	<b>-105,797</b>	<b>-94,482</b>	<b>-62,503</b>	<b>-4,932</b>	<b>60,746</b>	<b>98,310</b>	<b>330,424</b>

In order to calculate the equity value it is necessary to calculate the discounted terminal value and add the net operating assets. At the time of calculation of terminal value we found that it would not be reasonable to consider a debt of \$416,234,000 in perpetuity. In this way, we removed the effect of the debt and calculated what would be the growth of the debt and interest if it increased according to the inflation.

Table 21 - Terminal Value Assumption: Debt in thousands

Debt 2020	416,234
Inflation	3%
Debt 2021	428,721
Growth per year	12,487
Discounted Value	278,848

Table 22 - Terminal Value Assumptions: Interest in thousands

Interest 2020	6,860
Inflation	3%
Debt 2021	7,066
Growth per year	206
Discounted Value	-4,596

Therefore, it is possible to determine the equity value. See table below.

**Table 23 - Equity Value in thousands**

<b>Terminal Value</b>	3,249,774
<b>Discounted Terminal Value</b>	1,961,616
<b>Enterprise Value</b>	1,852,958
<b>Non Operating Assets</b>	281
<b>Equity Value</b>	1,853,239

Consequently, the equity value of WhatsApp under FCFE approach is \$ 1,853,239,000.

## 7. Sensitivity Analysis

### 7.1. Scenarios Approach

The most used method in evaluating a company is discounted cash flows. However, companies operate in a volatile environment that could positively or negatively affect the company. It is important for investors to be aware of possible fluctuations in indicators such as cost of capital, cost of debt, cost of equity and inflation rate, among others. One of the most common techniques for measuring this type of fluctuation is a sensitivity analysis. The main goal of a sensitivity analysis is to measure the impact that the variation of some variables has as whole. Thus, it will be relevant to perform a sensitivity analysis of the WhatsApp case.

The variables that will be considered to perform this sensitivity analysis are cost of equity ( $R_e$ ), cost of debt ( $R_d$ ) and perpetuity growth rate ( $g$ ). These variables were chosen because we consider them to be the most subjective since they were determined based on few assumptions.

In an initial phase the goal is to realize which variable has a greater impact on WhatsApp's valuation. Thus, it was assumed that each variable will vary by 1%, *ceteris paribus*.

**Table 24 - Variables Impact in thousands**

	Enterprise Value - FCFF	Enterprise Value - FCFE
$g$	2,766,412	1,996,204
$R_e$	1,507,640	1,434,008
$R_d$	1,929,268	1,853,239

The table above shows that the most sensitive variable is the perpetuity growth rate ( $g$ ). Therefore, three different scenarios were developed: optimistic, expected and pessimistic. The variable with lower variation will be the perpetuity growth rate since it is the most sensitive among the three. Thus, in the optimistic scenario the perpetuity growth rate will increase by 1%, while cost of debt and cost of equity will decrease by 2%. In the pessimistic scenario, the behavior of the variables will be the opposite, that is, the perpetuity growth rate decreases 1% and the cost of debt and cost of equity will increase by 2%. The expected scenario is the one that was assumed in the WhatsApp's valuation. In the following tables we can verify the enterprise value of each of the scenarios applying FCFF and FCFE model.

**Table 25 - Enterprise Value for each scenario in thousands**

<b>Optimistic Scenario</b>	<b>FCFF</b>	9,788,879
	<b>FCFE</b>	4,188,633
<b>Pessimistic Scenario</b>	<b>FCFF</b>	937,865
	<b>FCFE</b>	1,089,785

In the optimistic scenario, the enterprise value reached \$9,788,879,000 in the FCFF model and \$4,188,633,000 in the FCFE, which represents an increase of 327% and 97%, respectively. On the other hand, in the pessimistic scenario the company value for the FCFF model is \$937,865,000 and FCFE is \$1,089,785,000. In terms of variation, it represents a decrease of 59% in FCFF and 49% in FCFE. Therefore, it is possible to conclude that this model is very sensitive to its variables as well as to the supposed assumptions.

## 7.2. Monte Carlo Simulation

After analyzing the Sensitivity Analysis results it was decided that it would be possible to test them by running a Monte Carlo simulation, using Crystal Ball software. This method uses random samplings and calculus to attain numerical results. Thus, the main goal is to verify what possible combinations would justify the value paid by Facebook and compare them with our own results. This means that, by using this software, we will play with the variables in order to reach the Facebook's outcome.

To run this analysis we have chosen cost of equity ( $R_e$ ), cost of debt ( $R_d$ ), perpetuity growth rate ( $g$ ), Return on Sales and NWCN/ Revenue ratio as variables. The first three were used in the sensitivity analysis before. To complement them it was chosen to add variables that were directly linked to sales results.

In this analysis we define a minimum (Min) and maximum (Max) value for each variable. For Cost of Debt and Cost of Equity we used the same values from our own Sensitivity Analysis, min of 1.47% for  $R_d$  and 5% for  $R_e$ . For Max values it was chosen 5.47% for  $R_d$  and 9% for  $R_e$ . Also, a min of 2% and max of 3% for  $g$ . For NWCN/Revenue a min of 2% and a max of 12.85%. Finally, for ROS, a min of 32.06% and max of 40.18%. See table below:

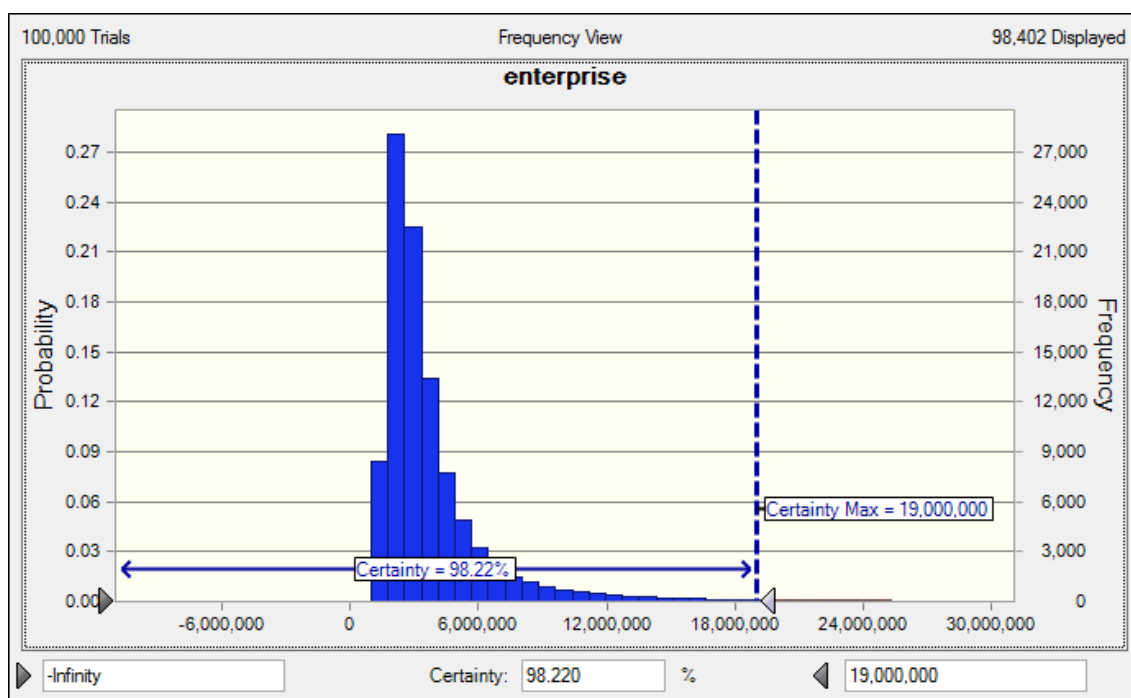
**Table 26 - Minimum and Maximum**

Variables	Minimum	Maximum
Cost of Debt	1.47%	5.57%
Cost of Equity	5.00%	9.00%
Perpetuity Growth Rate	2.00%	6.00%
NWCN/ Revenue	2.00%	12.85%
ROS	32.06%	40.18%

As stated before, we have set \$19 billion as maximum value, according with Facebook’s evaluation.

Using Crystal Ball Software, it is very clear to understand that, for a total of 100,000 observations, the enterprise value paid , by using the FCFF method, is lower than \$19 billion 98,22% of the times. See the following graphic.

**Figure 2 - Monte Carlo Forecast Frequency Chart**



With this simulation we have retrieved the complete forecast, and decided to only analyze the first five results above \$19 billion evaluation:



**Table 27 - Crystal Ball's Enterprise Value**

Enterprise Value	Cost of Debt	Cost of Equity	Perpetuity Growth Rate	NWCN/ Revenue	ROS
19,087,074.55	4.24%	6.89%	5.96%	7.45%	33.35%
19,062,665.07	3.04%	5.24%	4.32%	2.85%	35.17%
19,059,222.76	2.54%	5.81%	4.82%	6.41%	34.51%
19,044,824.01	3.07%	5.68%	4.72%	9.96%	37.03%
19,027,096.42	3.05%	5.37%	4.50%	11.88%	34.54%

To achieve the \$19 billion evaluation the overall variables would have to be more optimistic than the ones we have obtained. For example, in the Perpetuity Growth Rate we decided to use 3% in our WhatsApp's valuation based on inflation recorded in the United States. Looking back to the table all values used is higher, which has a direct impact on the final enterprise value.

Finally, we selected all the observations with an enterprise value between 19.250 million and 18.750 million. We chose this range since it is close to the amount paid by Facebook. This interval is composed by 65 observations (see Appendix 2).

We performed an average of the variables belonging to the chosen interval and compared with the assumptions assumed in our evaluation. See the table below:

**Table 28 - Average Enterprise Value (Crystal Ball)**

	Cost of Debt	Cost of Equity	Perpetuity Growth Rate	NWCN/ Revenue	ROS
Average	3.32%	6.03%	5.07%	8.36%	35.70%
Assumed Variables	3.47%	7.00%	3.00%	9.86%	35.62%
Variation	-0.15%	-0.97%	+2.07%	-1.50%	+0.08%

The lower the cost of equity, the cost of debt and the NWCN / Revenue ratio the better the valuation. On the other hand, the higher the perpetuity growth rate and the ROS, the more positive the impact on the evaluation. In this way it is possible to conclude that within this range of observations the variables will have a more positive impact on the enterprise value than those assumed in the baseline model, which. it is possible to verify through the variation line in Table 28.

## **8. Conclusion**

On 19<sup>th</sup> February 2014, Facebook announced the acquisition of WhatsApp for \$19 billion. \$4 billion in cash, \$12 billion in Facebook shares and \$3 billion in restricted stock units.

As previously explained, the purpose of this thesis is to make an evaluation of WhatsApp in order to conclude the amount paid by Facebook.

In Chapter 6.4., we performed the valuation based on the discounted cash flow method. Since WhatsApp is not a listed company the access to information is quite limited. This way, there was a need to create some assumptions. These have been defined with a critical view and based on companies in the same industry, like Facebook and Twitter. Since it is quite common for some indicators to fluctuate, a sensitivity analysis has been performed. The main objective of this analysis is to understand the impact that some of the variables that we consider to be more subjective may have in the final amount of WhatsApp's valuation.

Through the evaluation we have reached an Enterprise Value amount of \$1,981 million by the Free Cash Flow to Firm approach and \$1,853 million by the Free Cash Flow to Equity. These figures are significantly below the amount paid by Mark Zuckerberg's company.

It is important to point out that the evaluation carried out in this work is purely financial, that is, the possible synergies that may arise from this transaction which are not considered given its subjectivity and the difficulty of measuring them. Therefore, we believe that the moment Facebook defined the price to pay for WhatsApp took into account some synergies that could impact the company's strategy.

One of the possible reasons behind this transaction maybe the fear that Mark Zuckerberg might have to lose WhatsApp to the competition. Through The Statista Portal site it is possible to verify that in 2014 Facebook was considered the most popular mobile application among the millennials with about 35% of popularity in second was WhatsApp with 32%. If Mark Zuckerberg's company did not proceed with this acquisition it could lose WhatsApp to other competitors and risk being no longer the most popular application among users.

One of the most debated topics these days is data protection. WhatsApp has technology that encrypts all incoming and outgoing messages. This know-how could be used to improve Facebook Messenger and ensure greater security for its users.

WhatsApp is characterized by the high number of daily users and their engagement. Mark Zuckerberg confirmed that the target company was the only application with more user engagement than Facebook. This may have helped the CEO of Facebook to make the decision to proceed with the operation.

Therefore, Facebook had three options: first, not acquire WhatsApp but find the know-how which would allow to improve its technology and its platforms to ensure that it continued to be the market leader in this industry; second, to acquire another company similar to WhatsApp but with a smaller size so it would be less expensive; and third to acquire WhatsApp. The decision prevailed was the last one.

Finally, through the Monte Carlo simulation it is possible to verify that for a total of 100,000 observations, the enterprise value paid is lower than \$19 billion 98,22% of the times.

It is possible to conclude that to carry out this valuation it will be necessary to go beyond the financial analysis and also consider the impact of the synergies that may arise from the operation. Despite what is mentioned in the above points we consider that the valuation of WhatsApp made by Facebook is over-rated. However, Mark Zuckerberg may have overestimate WhatsApp to ensure that this operation would succeed.

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## 10. Appendixes

### Appendix 2 – WhatsApp’s Financial Statements

WhatsApp Inc.		Balance Sheets	
<i>(In Thousands, Except for Number of Shares and Par Value)</i>			
		December 31,	
		2013	2012
<b>Assets</b>			
Current assets:			
Cash	\$	45,542	\$ 6,558
Accounts receivable		2	2,161
Prepaid expenses and other current assets		2,866	933
Total current assets		48,410	9,652
Restricted cash		1,800	–
Property and equipment, net		281	186
Other assets		295	1,112
Total assets	\$	50,786	\$ 10,950
<b>Liabilities, redeemable convertible preferred stock, and stockholders’ deficit</b>			
Current liabilities:			
Accounts payable	\$	3,983	\$ 1,125
Accrued liabilities and other current liabilities		5,810	445
Early exercise liabilities, current portion		548	33
Deferred revenue, current portion		16,247	5,119
Total current liabilities		26,588	6,722
Early exercise liabilities, non-current portion		332	43
Deferred revenue, non-current portion		33,129	24,243
Total liabilities		60,049	31,008

WhatsApp Inc.  
 Statements of Operations  
*(In Thousands)*

	Year Ended December 31,	
	2013	2012
Revenue	\$ 10,210	\$ 3,821
Costs and expenses:		
Cost of revenue	52,867	18,858
Research and development	76,911	34,487
General and administrative	18,870	6,035
Sales and marketing	30	17
Total costs and expenses	148,678	59,397
Loss from operations	(138,468)	(55,576)
Other income (expense), net	(264)	8
Loss before benefit from income taxes	(138,732)	(55,568)
Benefit from income taxes	586	899
Net loss	\$ (138,146)	\$ (54,669)



## Appendix 2 – Crystal Ball Observations Between 18,750,000 and 19,250,000

Enterprise Value	Cost of Debt	Cost of Equity	Perpetuity Growth Rate	NWCN/Rev.	ROS
19.253.644	3,58%	5,63%	4,82%	10,61%	32,46%
19.240.494	3,00%	5,70%	4,76%	8,15%	35,63%
19.238.153	4,74%	5,60%	4,82%	4,65%	34,28%
19.237.204	1,57%	7,15%	5,91%	4,49%	35,48%
19.235.939	4,41%	6,45%	5,51%	9,94%	37,47%
19.230.290	3,69%	6,40%	5,40%	11,64%	38,42%
19.208.500	1,71%	6,47%	5,35%	4,99%	33,90%
19.208.377	2,49%	6,55%	5,46%	9,24%	36,58%
19.201.008	4,27%	6,09%	5,15%	5,28%	37,36%
19.194.929	4,96%	5,44%	4,72%	8,25%	33,98%
19.184.323	2,50%	5,43%	4,46%	5,58%	35,61%
19.179.984	5,05%	5,62%	4,92%	11,60%	33,80%
19.173.349	2,99%	6,77%	5,73%	5,29%	33,69%
19.168.153	2,38%	6,24%	5,17%	3,57%	34,73%
19.162.550	3,19%	5,61%	4,73%	12,09%	35,10%
19.161.137	4,71%	5,97%	5,06%	7,05%	38,69%
19.145.144	1,92%	6,68%	5,53%	9,39%	36,66%
19.137.320	4,05%	5,50%	4,66%	9,05%	35,98%
19.134.531	3,36%	6,04%	5,08%	7,06%	35,41%
19.128.645	3,64%	5,59%	4,63%	8,07%	39,62%
19.109.836	2,99%	5,46%	4,51%	7,10%	36,92%
19.103.549	2,30%	6,84%	5,74%	10,20%	35,08%
19.095.726	3,32%	6,06%	5,13%	10,39%	34,79%
19.095.043	3,74%	5,98%	5,03%	4,26%	35,90%
19.094.423	3,54%	5,88%	4,95%	5,59%	35,02%
19.094.165	1,92%	6,21%	5,06%	9,96%	38,96%
19.087.075	4,24%	6,89%	5,96%	7,45%	33,35%
19.062.665	3,04%	5,24%	4,32%	2,85%	35,17%
19.059.223	2,54%	5,81%	4,82%	6,41%	34,51%
19.044.824	3,07%	5,68%	4,72%	9,96%	37,03%
19.027.096	3,05%	5,37%	4,50%	11,88%	34,54%
19.019.754	3,73%	6,29%	5,30%	3,30%	35,75%
18.994.056	1,61%	6,56%	5,43%	9,31%	34,92%
18.994.022	2,60%	5,93%	4,95%	10,49%	34,96%
18.988.388	2,38%	5,65%	4,71%	9,97%	33,76%
18.982.089	3,61%	5,61%	4,78%	9,05%	32,90%
18.981.053	3,57%	5,82%	4,93%	8,14%	34,38%
18.973.596	3,17%	5,46%	4,47%	8,94%	39,27%
18.964.174	2,23%	5,62%	4,67%	9,09%	33,35%
18.948.456	2,34%	6,81%	5,75%	9,54%	32,96%
18.945.558	3,08%	5,66%	4,71%	10,18%	36,97%

18.937.627	4,91%	5,93%	5,10%	8,61%	36,26%
18.933.357	3,92%	5,88%	4,93%	7,74%	37,79%
18.930.689	3,94%	6,76%	5,75%	12,02%	37,91%
18.899.418	2,65%	6,90%	5,74%	6,70%	37,20%
18.897.686	3,53%	5,80%	4,89%	5,90%	34,54%
18.878.639	4,25%	6,10%	5,17%	11,36%	38,15%
18.867.470	3,26%	6,47%	5,49%	11,67%	35,39%
18.863.340	4,53%	6,08%	5,27%	7,39%	32,65%
18.858.095	2,65%	5,97%	4,92%	8,14%	37,43%
18.850.900	2,67%	6,67%	5,55%	9,15%	37,68%
18.841.397	4,49%	5,77%	5,01%	10,93%	32,93%
18.834.023	2,37%	5,87%	4,79%	9,81%	38,74%
18.832.723	2,95%	6,35%	5,35%	11,51%	35,47%
18.805.915	4,20%	6,59%	5,65%	7,83%	34,98%
18.804.282	3,89%	5,54%	4,66%	8,69%	36,66%
18.801.563	3,49%	6,26%	5,34%	10,12%	33,68%
18.794.213	4,31%	5,79%	4,94%	9,08%	35,88%
18.781.682	2,84%	5,85%	4,78%	4,04%	38,38%
18.780.536	2,90%	6,15%	5,13%	6,04%	35,41%
18.773.567	4,16%	5,57%	4,72%	8,57%	36,10%
18.770.673	3,78%	5,32%	4,52%	8,31%	33,42%
18.769.231	3,09%	6,54%	5,54%	10,94%	34,86%
18.763.119	2,50%	5,68%	4,70%	9,79%	35,29%
18.750.193	4,28%	6,09%	5,15%	8,83%	38,28%