# Unicorns Analysis: An Estimation of Spotify's and Snapchat's Valuation

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# Abstract

The rise of smartphones and social media meant amongst others the boom of unicorns, name given to the start-ups that are valued over $1 billion. A potential tech bubble, already called "the start-up bubble", is firstly discussed indicating current overvaluations of unicorns. It is shown that unicorns going public tend to be over-valued, but are also quickly sanctioned if revenue don't fit expectations. Facebook and Twitter are then analyzed, with the aim to illustrate two development paths that can be considered as best and worst case scenarios of growths and product development. Finally, Spotify's and Snapchat's cases are analyzed, based on the valuation methodology introduced by Peter Cauwels and Didier Sornette [43]. We examine the conditions that they should fulfill, in terms of revenue and profit margin, to fit their respective current valuations. The findings suggest that Snapchat seems to have a bright future with an optimistic valuation that isn't inconceivable. Spotify's case is more problematic considering the many barriers the company is facing on its way towards profitability.

# Contents

## Acronyms and Vocabulary

- DCF: Discounted Cash Flow
- NPV: Net Present Value
- Start-up: Private company whose main characteristic is to scale very quickly[27].
- Unicorn: Private company - or in this case, start-up - valued at more than $1 billion[31].
- P/E ratio: Price of a share divided by earnings it brings
- EBIT: Earnings Before Interest and Taxes
- EBITDA: Earnings Before Interest, Taxes, Depreciation and Amortization
- MAU: Monthly Active Users. Key metric for social medias representing the total of users active at least once a month on a certain service.
- DAU: Daily Active Users, the number of unique visitors in 24 hours.
- DAU/MAU: Ratio used to measure the frequency of use of an app or website. A DAU/MAU of 50% means that an average user visits the platform 15 days a month.
- IPO: Initial Public Offering
- Q1,Q2,Q3,Q4: First, second, third or fourth quarter (respectively, end of March, June, September, December of a certain year)
- ARPU: Average Revenue Per User

# Chapter 1

# Introduction

The goal of this thesis is to analyze and discuss the valuations of Snapchat and Spotify. They are taken as examples of growing unicorns having a high assumed market value. Their upcoming IPOs makes such analyses required. Rumors and news about valuations can be found daily basis in main tech media, but are too rarely discussed in depth. Different valuation techniques are first introduced and the Discounted Cash Flow method explained. This method is used for the valuation calculations.

The current technological context is then described and discussed with a specific focus on the current practices in the valuations of companies. The analysis of the current financial context should be pushed much further in order to have definite conclusions on the existence of a bubble for instance. However, the different financial ratios analyzed for related companies (such as Facebook, Twitter, Linkedin or Renren) give a snapshot of the financial context in which unicorns are developing. Companies such as the ones quoted previously are examples of grown-up unicorns. Their valuations are examined, outlining the role and importance of expectations.

The logistic function used to describe diverse growing populations is then explained and detailed. The growth of Internet users is modeled to assess the growth of big social media players. Facebook and Twitter are then analyzed. As examples of diametrically opposed user growths, they inform the analysis methodology of currently growing unicorns. Although many factors explain the evolution, a hypothesis that is brought forward in this thesis, is that technological improvement of the product is probably the main growth driver. Furthermore, the ARPU for each company are analyzed. Despite very different users' growth, the revenues of both companies have been evolving exponentially for the last years, suggesting a decoupling between the growths of revenue and users.

Finally, valuations for Spotify and Snapchat are assessed. Instead of giving exact figures, their

future value on the stock market is discussed, based on their current valuations and on their potential performances. For both companies, user growth scenarios are calculated. Assumptions are made to predict their future revenue and profit margin needed for reasonable cash flows.

## 1.1 Valuation Methods

Fernandez classified the companies valuation methods into four main categories [18]:

1. Balance Sheet: the company's value is determined by analyzing the value of its assets. This is irrelevant when it comes to valuing unicorns such as Facebook, because it gives a static value of the current assets belonging to the company.

2. Income Statement-based methods: based on analyzing the size of the sales, earnings or other indicators of a company. They help comparing easily companies with each other and are relevant when it comes to valuing internet-related unicorns. They will be used to compare unicorns that became publicly traded companies.

3. Goodwill-based methods: methods valuing intangible assets such as quality of the customer portfolio, brands or strategic alliances, which isn't relevant for emerging companies.

4. Cash Flow discounting-based methods: methods aiming at determining the company's value by predicting the future cashflows and discounting them to determine the present value. As Fernandez states, cash flow discounting methods are nowadays mostly used because they are "the only conceptually correct valuation methods. In these methods, the company is viewed as a cash flow generator and the companys value is obtained by calculating these flows present value using a suitable discount rate."

Similar classifications have been determined by other scholars [17] [2]. Discounted cash flow methods, as part of the fourth category, have been determined as most relevant by many([57][18]) and numerous variations of these have been discussed and described([37] [3] [5]).

To assess and discuss the value of Spotify and Snap Inc., a DCF methodology introduced by Peter Cauwels and Didier Sornette [43] is firstly introduced and discussed. Facebook's and Twitter's cases are then analyzed. Several examples of such fast growing user based companies exist. Learnings from Facebook's and Twitter's analyses provide valuable elements for discussing the assumptions made for future valuations.

## 1.2 Discounted Cash Flow (DCF) Method

The valuations in this thesis will be assessed by the Discounted Cash Flow (DCF) technique. It is aimed here to highlight its key assumptions that one should bear in mind while seeing the valuations

obtained with this method. The goal is to calculate the present value difference between the future cash inflows and the future cash outflows. Future cash flows are discounted with a discount rate, in order to take into account the time value of money (assumption that money made in 10 years has less value than money that will be made in one year)[25]. An important assumption of this method is that the company is depicted by its cash flows only and no other parameter is taken into account. This assumption is critical in the case of unicorns' valuation because it translates the expectations into hard facts.

The formula for the DCF is given by:

$$DCF = \sum_{t=1}^{T} \frac{CF_t}{1 + r^t} \tag{1.1}$$

where $CF_t$ is the cashflow computed for each period $t$ and $r$ the discount rate. The time horizon is an important factor influencing the valuation calculated. As executed in [43], to be on the high side, a fifty years time frame will be taken into account, meaning that the cash flows for the fifty next years will be calculated and discounted. Furthermore, it is generously assumed that the real interest rates are essentially null for these future years. Those assumptions simplify the procedure and push the valuations to the high side.

Finally, the discount factor is the last main variable of the method. Fernandez [19] determined in 2011 that the equity risk premium, over a large study, averaged around 5%. Valuations for a larger range of discount factors will be calculated and 5% will be used as a benchmark.

# Chapter 2

# Context

In 1995, as Netscape went public, the valuation of the initial public offerings (IPOs) started to be questioned. Until then, most companies had to exhibit proven earnings and a certain experience of operations. Netscape didn't and its valuation was based solely on future expectations. As a result, the company, that had one tenth of the earnings that Microsoft had when it went public in 1986, saw its shares boom from twenty-eight dollars per share to seventy-one dollars [24].

It would require an entire thesis to list the similarities and differences between the current technological era and the Dot-Com bubble and to draw conclusions on whether we're seeing a bubble or not. Nevertheless, discussing similarities is needed, to inform the overall companies' valuation process. Here, the goal isn't to draw a conclusion on whether there is a proper Tech Bubble or not. It is rather to analyze the current big financial picture as the context of the future IPOS.

To begin with, there is a technological incremental step happening. The rise of smartphones and the evolution into the Web 2.0, allowed many start-ups to grow based on the users contributions[23]. The magnitude will most certainly be lesser than the outreach of the Internet, but it can be considered as a major milestone in the Internet's history. According to David Einhorn, a famous hedge-fund manager at Greenlight Capital, there is a clear consensus that we are witnessing our second tech bubble in 15 years [49]. What is uncertain is how much further the bubble can expand, and what might pop it. There are many factors at play.

Start-ups aren't limited to Internet, but Internet facilitated scalability and therefore quick growths. Valuations are much more reasonable and rational now than they were during the dot-com bubble, according to a chief strategist [47], but analysts suggest they are moving closer to bubbly levels: in the first quarter of 2014, 83% of the companies that went public were not profitable. As a matter of comparison, there were 84% of the newly created IPOS that weren't profitable in the first quarter

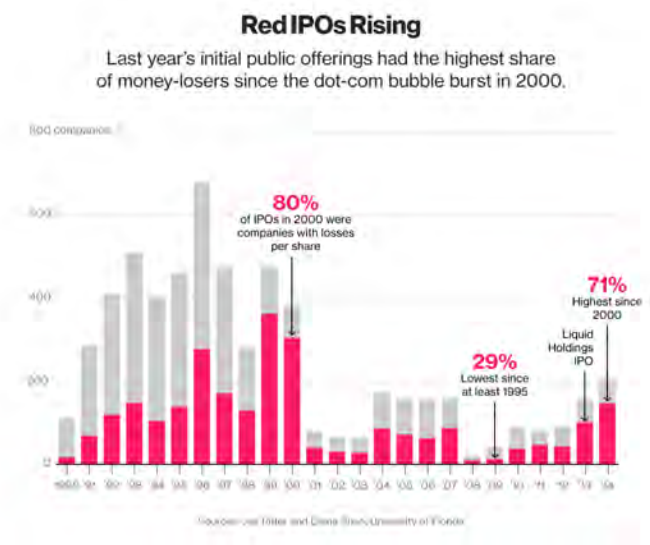


Figure 2.1: The share of money-losing IPOS is rising. The amount of companies makes it hard to make conclusions since it is still far from 2000's levels, but it is a sign.
Source: *https://assets.bwbx.io/images/users/iqjWHBFdfxIU/iZe2v74tre6E/v3/-1x-1.jpg*

of 2000, at the peak of the dot com bubble [48]. Figure 2.1 presents the evolution of this share calculated on a yearly basis.

### P/E Ratio

The P/E Ratio (also called PER) is obtained by dividing a company's equity value by its annual net income [18]. It is an important indicator of the stock market and also more specifically to evaluate a company's valuation (established by the market) against its actual earnings. A high P/E ratio means that the price of the share is high compared to the earnings it brings.

The evolution of P/E ratios, as represented on Figure 2.2 doesn't show any behavior similar to what happened during the Dot-Com bubble. Nevertheless, this bubble would concern companies within a tighter scope than "Information Technology". If we therefore analyze selected companies (Figure 2.3), a different behavior can be observed. This isn't an exhaustive list, but a sample of companies with user-generated content. The P/E analysis for this specific category of companies helps mapping the context in which Spotify and Snapchat will enter and gives insights about what can be excepted for their IPO.

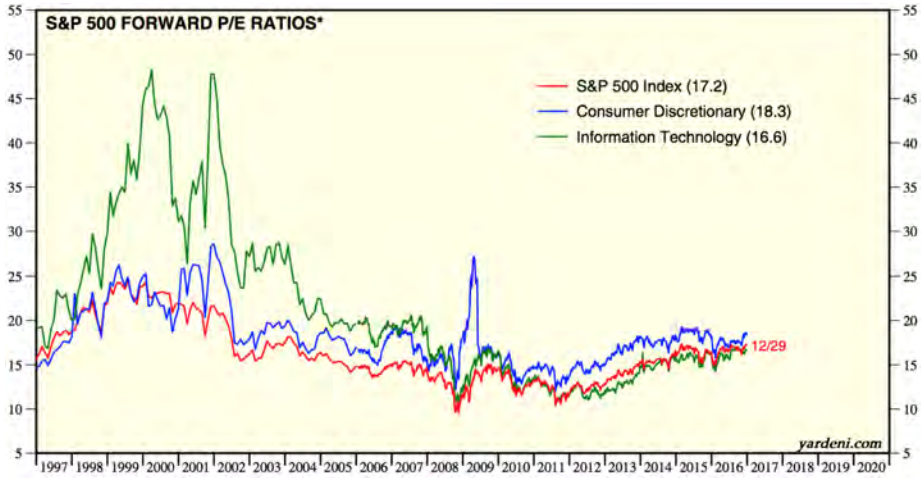


Figure 2.2: P/E Ratios over Time for different sectors [58]. The IT sector overall doesn't show any behavior close to what has been experienced during the Dot-Com bubble.

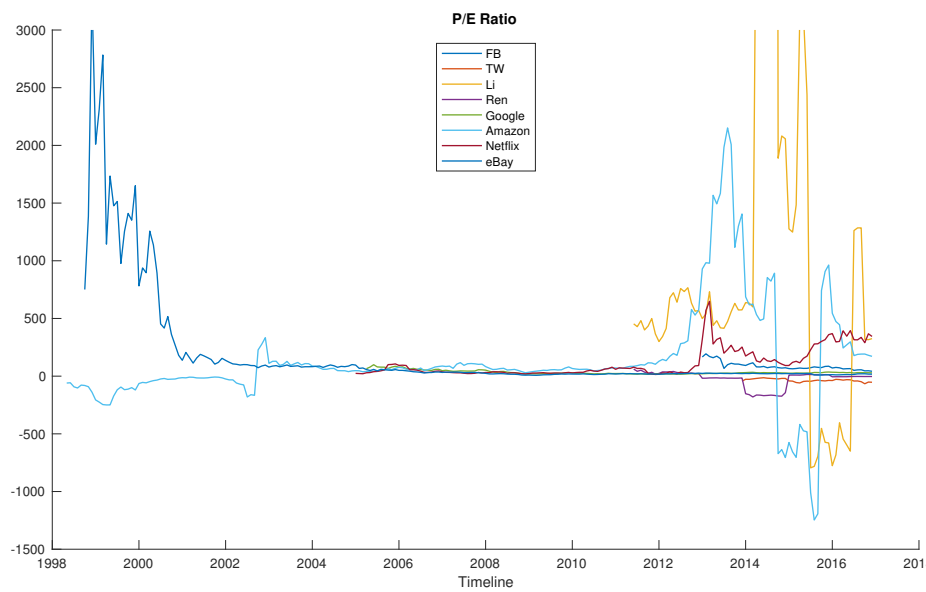


Figure 2.3: P/E Ratio Calculated for selected Tech Companies. It is notable that companies such as Amazon or Netflix experience high variance in their PE ratio after a long period of stability [58].

### Revenue Multiple

Another interesting ratio is the Price to Sales ratio (also called sales or revenue multiple). The goal here is to calculate the factor by which sales are multiplied to get the valuation or by which the

annual revenue is multiplied to get the market capitalization. This gives an idea of the value given to each dollar of revenue [28]. Therefore, a high sales multiple means that a very high value is given to the sales made, meaning either that it is over-valued or that there are very high expectations in the growth of sales.

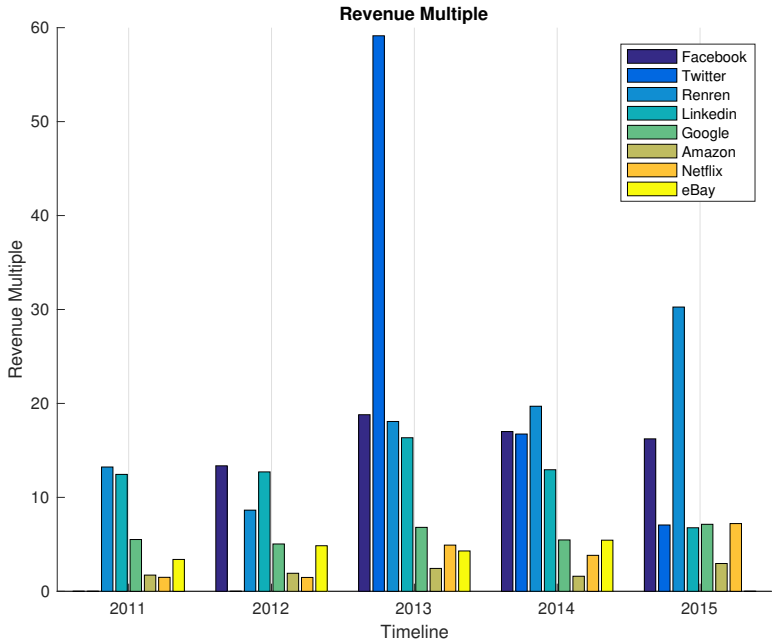


Figure 2.4: Revenue multiple calculated for selected Tech Companies. There is a clear difference between the first four group of social media companies (Facebook, Twitter, RenRen and LinkedIn) and the other "older" IT companies

In Figure 2.4, it is interesting to see how such a simple indicator can give information about the valuation. The first interesting observation is how the social medias (namely Facebook, Twitter, Renren and LinkedIn) have a revenue multiple much larger than other confirmed internet-oriented companies (Google, Amazon, eBay and Netflix). Twitter even reached a near 60X multiple in 2013. Although high expectations were put in those companies, Twitter and LinkedIn came back to "normal". Renren's large revenue multiple in 2015 is due to a decrease in revenue (compared to what was expected) that hasn't been reflected in the valuation. It came down to a 10X in 2016.

The main explanation to this is: expectations. Indeed, if the revenue is expected to be multiplied by $\alpha$ and the valuation stays the same, the revenue multiple is to be divided by $\alpha$. [56]. Here is the key point of this master thesis: are the expectations valid or not? It is clear here that hopes put in Twitter in 2013 were disproportionate considering its results afterwards. Twitter's revenues

increased but its revenue multiple dropped because its valuation decreased.

This is also why Google's, Amazon's and eBay's revenue multiples are lower, because those are companies that proved to be profitable. There is of course hope for growth, but it is smaller than the one put in current tech unicorns, especially social media companies. Another important factor is the companies' maturity. More historical data are now available for their valuation, unlike social media channels that are rather new and which future isn't clear.

This phenomenon was of utmost importance during the Dot-Com bubble, where the lack of hindsight led to surrealistic expectations for companies having a "Dot Com" in their name. We can nevertheless observe a key difference with the Dot-Com bubble. The revenue multiple of Twitter and LinkedIn went back to "normal" in 2015. This shows that market may put unreasonable hopes in companies but is also able to correct very quickly. Twitter's revenue multiple has been corrected in 2015 as soon as it showed signs of decreasing growth of users.

As a conclusion, markets tend to over-estimate current tech companies, especially social media players. The P/E ratios calculated for selected companies seem to indicate that there may be a bubble around such companies. Although they may be over-valuated at start, if future growth looks promising, their valuation is corrected when the growth rates decline. This indicates that Snapchat and Spotify will probably get high expectations and therefore high valuation. Nevertheless, their future quarterly reports may very quickly correct those valuations if growth expectations aren't met.

# Chapter 3

# User Growth Prediction Methods

Predicting the growth of users will be of utmost importance to calculate a reasonable net present value for a given company. Different techniques can of course be used to achieve this. The logistic function or S-shaped curves have been widely used to describe growth of various phenomena, such as sells of of telephones, tractors or chemical products but also in biological sciences to analyze the growth of different living organisms[36]. As it will shown with the numerous examples analyzed, this function is adapted to the start-ups analyzed here. This chapter explores the characteristics of this function, its advantages and its limitations.

## 3.1 Logistic Function

Discussing the logistic function is important to understand the model used to approximate the evolution of users. Sigmoid functions (because of its singular "S" shape), or logistic function [1], is typically written:

$$f(x) = \frac{L}{1 + e^{-k(x-x_0)}} \tag{3.1}$$

This equation describes a standard logistic function. With respect to the model used for population growths, $f(x)$ is replaced by $P(t)$, that stands for the population over time. $L$ is replaced by $K$, the carrying capacity and $Kk$ replaced by $r$ the initial growth rate:

$$P(t) = \frac{K}{1 + e^{-r(t-t_0)}} \tag{3.2}$$

Defining $P(0) = P_0$:

$$e^{rt_0} = \frac{K}{P_0} - 1 \tag{3.3}$$

[1] The different terminologies will be used indifferently.

Replacing this in (3.2) gives:

$$P(t) = \frac{KP_0e^{rt}}{K + P_0(e^{rt} - 1)} \tag{3.4}$$

Where:

$P(t)$ = The population over time (also written N(t))
$K$ = The curve's maximum value or the Carrying Capacity in a real life example
$r$ = The steepness of the curve or the initial growth rate
$t$ = The time

The influence of these parameters is illustrated in Figure 3.1. Equation 3.4 will be used extensively throughout this thesis to approximate populations and by extension, the growth in users.

## 3.2 Discrete Growth Rate

The differential equation describing the relationship between the exponential discrete growth rate and the population is given by:

$$\frac{dP}{dt}\frac{1}{P} = r(1 - \frac{P}{K}) \tag{3.5}$$

As illustrated in Figure 3.2, the differential equation represents a linear function of the growth rate as a function of the population. Initially, the growth rate equals $r$, which allows the initial exponential growth of the logistic curve. The growth rate decreases then linearly zero, giving the carrying capacity $K$.

### 3.2.1 Fitting Methods

#### Discrete Growth Rate Calibration

The first method to approximate the users evolution uses the discrete growth analysis, to determine $K$ and $r$. The principle is rather easy. Having a set of data like the number of Facebook users over time, we can then calculate the discrete exponential growth rate between each point:

$$R_i^d = \frac{ln(\frac{P_i}{P_{i-1}})}{t_i - t_{i-1}} \tag{3.6}$$

With a simple linear regression, the growth rates obtained with Equation 3.6 can be interpolated. Detailed explanations can be found in [43]. In, Figure 3.3 the linear regression fitting the discrete growth rate can be observed. In such an example, the carrying capacity is easily determined and is

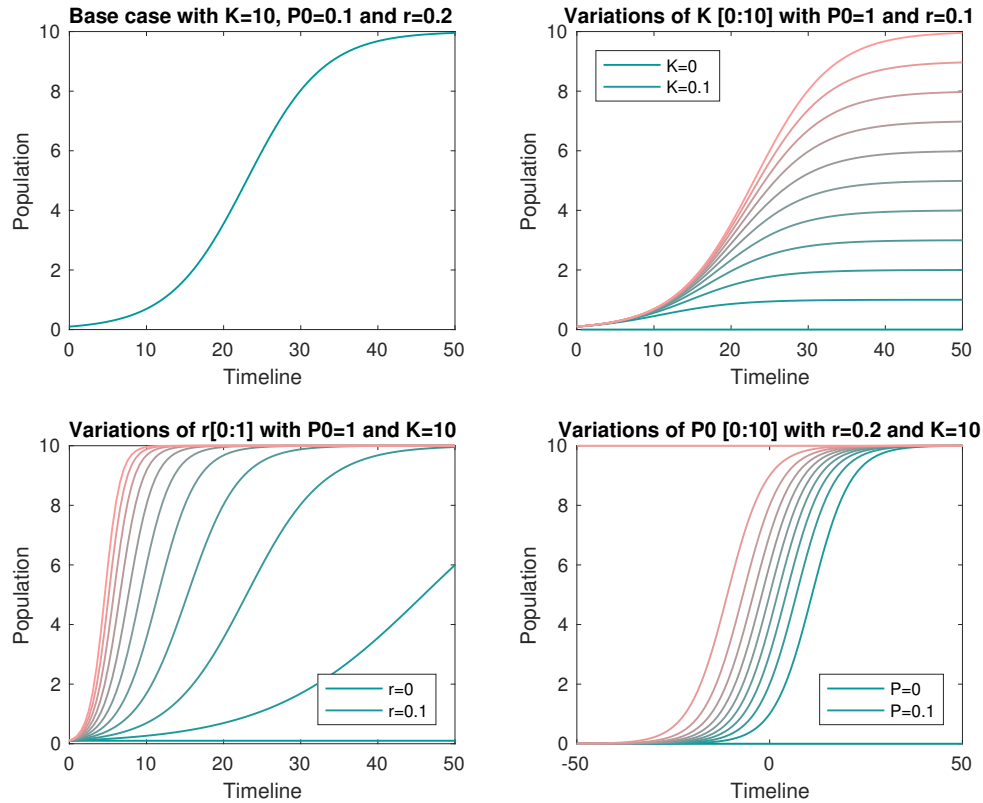


Figure 3.1: **a)b)c)d)** Influence of the parameters on the S-Curves shapes. The carrying capacity has an impact on the amplitude. The initial growth rate influences how quickly the carrying capacity will be achieved. Finally $P_0$ shifts the curve horizontally.

reached once the discrete growth rate equals to zero. Twitter's complete analysis can be found in subsection 4.1.

Once $r$ and $K$ has been determined, $P_0$ can be found by rearranging terms in (3.4). The following equation is obtained:

$$P_{0,i} = \frac{P_i K}{P_i(e^{r_i t} - 1) - K e^{r_i}} \tag{3.7}$$

As such, by calculating the average of the discrete $P_0$ obtained, a fit for $P_0$ is determined. It will be shown later on that this methodology has its limitations depending on the population data that is fitted.

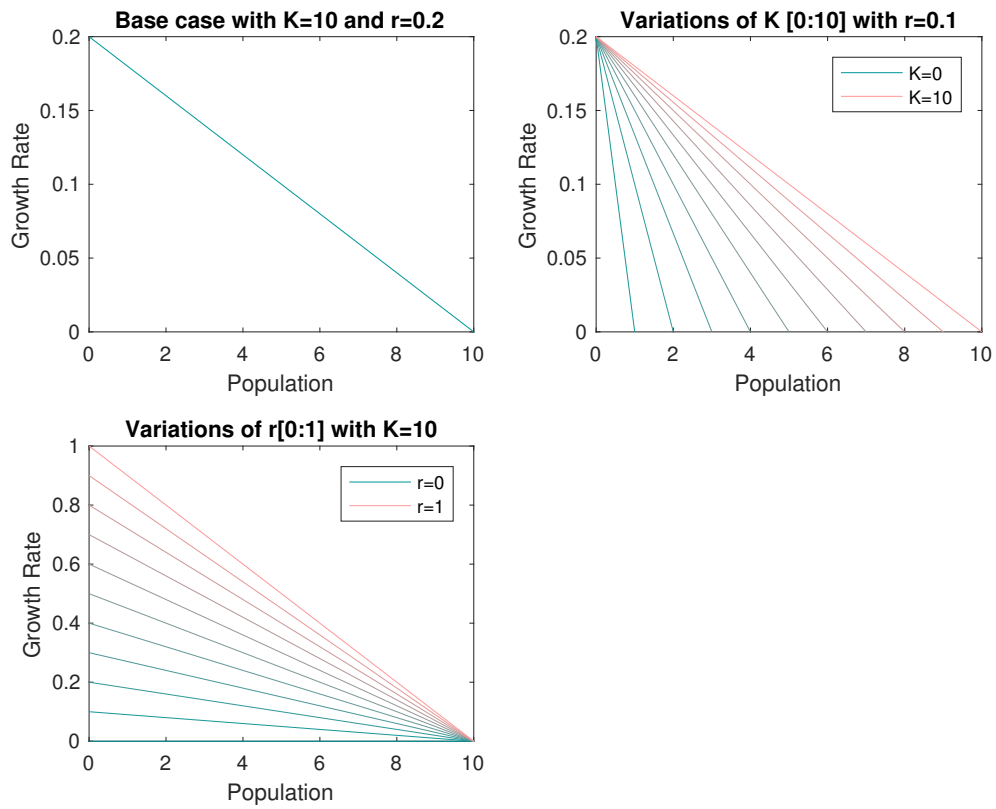


Figure 3.2: **a)b)c)** The analysis of the exponential discrete growth rate gives good insights on whether the logistic curve will be a good fit or not. If the discrete growth rate decreases linearly as a function of the population, the logistic curve is most probably a great fit.

### Function Optimization

Another straightforward method is to fit directly the logistic function to the observed population data. This method is especially helpful when the discrete growth rate data is present too much noise or is too limited to fit significantly a linear regression. The difference of outputs between the two methods is shown in the population predictions, such as Figure 3.7.

### Logistic Function Variations

The logistic function described previously is a simple function and a convenient way to approximate growth behaviors influenced by a very large amount of factors. A simple improvement of the function would be to let $K$ grow as a function of time. This especially makes sense, in cases where population is for example, using an app or social media channel. Firstly, because the overall population in the

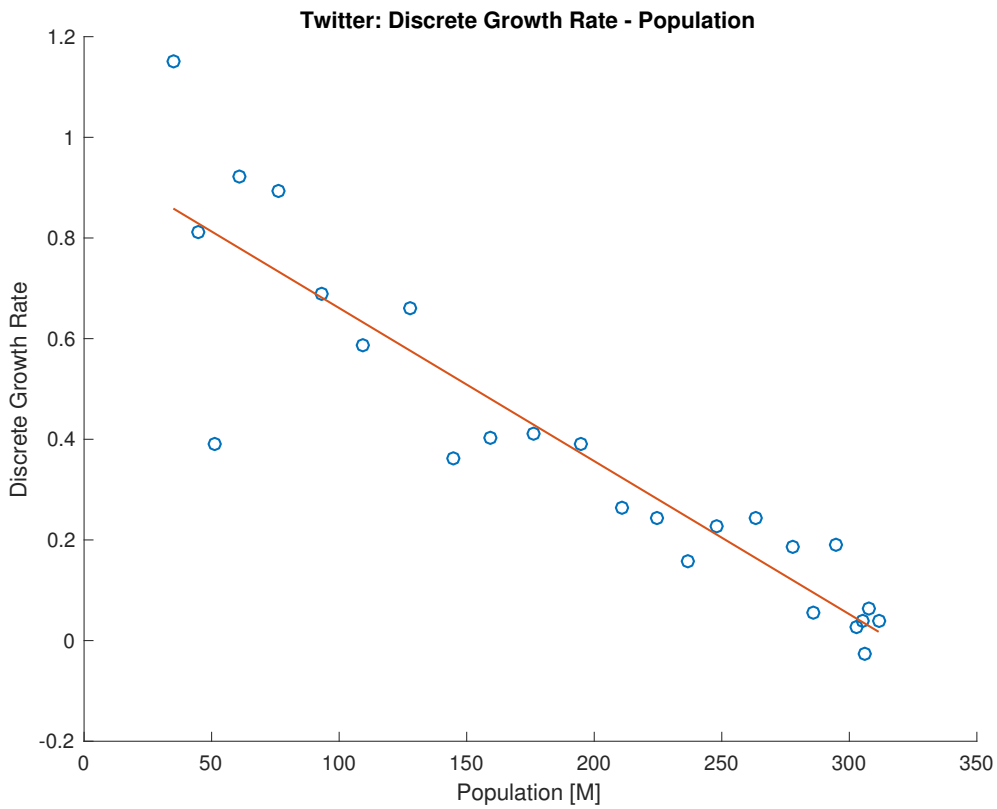


Figure 3.3: Discrete exponential growth rate as a function of Twitter's population, in terms of MAU. The discrete exponential growth rate is a linear function of the population: $y = 0.96 - 3.04 \cdot 10^{-9} \cdot x$. Therefore, $r = 0.96$ and $K = \frac{r}{-3.04 \cdot 10^{-9}} = 3.17 \cdot 10^{8}$

world is growing. Secondly, because the percentage of people using Internet grows as well. These two arguments are illustrated in Facebook's analysis in subsection 4.1. The rise of smartphones and of people having access to Internet increases the amount of potential users. It then becomes obvious that having a fixed carrying capacity would be a not realistic simplification. The question is then: how does the carrying capacity grow? The choice of the function must be discussed and backed up by strong hypotheses. A way to bypass this issue is to model the growth of the overall population and normalize our concerned population. This way, instead of analyzing the growth of users, we analyze the growth of the penetration (namely the percentage of the total potential population using the product instead of the absolute number).

## 3.3 Internet Users Growth Analysis

Evaluating the growth of the overall Internet users is needed to account for the growing carrying capacity of a certain service. This allows to analyze whether the user growth of a company observed is due to an increasing penetration or simply related to more people having access to Internet. Predicting the future number of Internet users is certainly not trivial because it is driven by multiple factors and uncertainty (which is discussed hereunder). Nevertheless, this exercise will be used to discuss the different fitting methods and models that will be used for predicting the unicorns' users evolution.

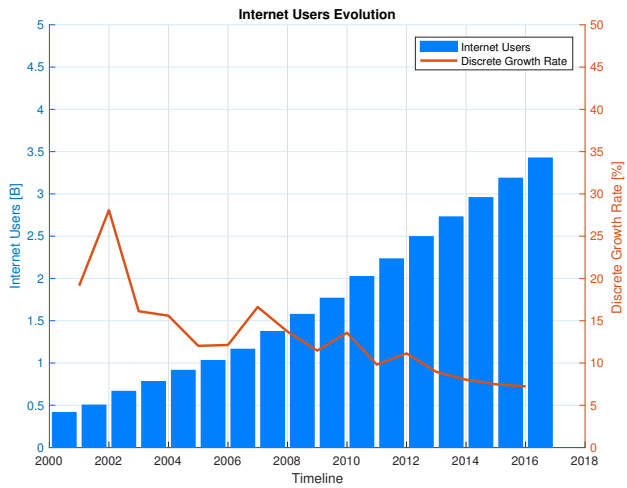


Figure 3.4: Evolution of Internet users with exponential discrete growth rates computed. Data Source: *http://www.internetlivestats.com/internet-users/*

### 3.3.1 Exponential Growth Rate Analysis

As Figure 3.5 shows, we apply the same methodology that was done for Figure 3.3. Again, the regression isn't accurate on the whole data sets and fits poorly the extreme points. Therefore, the two first points are ignored and the regression is applied again. Different key aspects can be drawn out of this simple manipulation, that will also be observed in other users predictions.

Firstly, the empirical points calculated don't form a line, but rather a curve that tends to a horizontal asymptote. A first argument to explain this is that the world population is growing. Which means that the carrying capacity, or in other words, the maximum amount of people that could potentially use Internet grows. Assuming that the carrying capacity is fixed and equals $K$ is certainly simplistic.

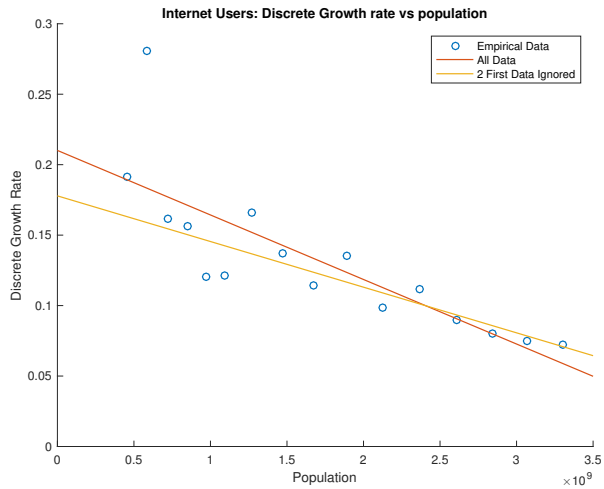


Figure 3.5: Evolution of Internet users. Ignoring first data helps fitting latest points. All data: $r = 0.21, K = 4.6 \cdot 10^9$, Two first data ignored: $r = 0.18, K = 5.5 \cdot 10^9$

As described previously, to tackle this issue we can either use another logistic function (by allowing $K$ to grow) or normalize the data by, in this case, dividing by the world population over time. Nevertheless, the different methods provide a similar fit, as shown in Figure 3.7.

Although the idea of normalizing the data should provide a better fit by allowing a growing carrying capacity, it doesn't entirely explain the shape of the discrete growth rate's graph. Indeed, Figure 3.6 looks very similar to one showing the population not normalized (Figure 3.5).

Many other factors can explain why the curve flattens. A hypothesis brought in this thesis and that will be emphasized with the example of Facebook and Twitter, is the technological evolution. Indeed, the Internet was not fifteen years ago the same as it is now. It evolved from a tool for a niche of scientists to become something of an everyday one-stop-shop for virtually everything. The technological evolution is a key element, because if internet hadn't evolved and had remained as basic as it was at the beginning, the various uses observed nowadays, in particular the social media, would most certainly not have emerged. It kept evolving, becoming easier to use, more user friendly and also more useful. The positive feedback loop generated by the network effect has of course a big role in this, in the sense that the more people are using it, the more value it has.

Another important factor is the heterogeneity of the population. Indeed, when Internet started, the whole world wasn't ready to adopt it. While the European and North American markets are soon to be saturated [52], Africa's users start growing with the rise of smartphones. This can be assimilated to a whole new population that can become potential Internet users, which wasn't the

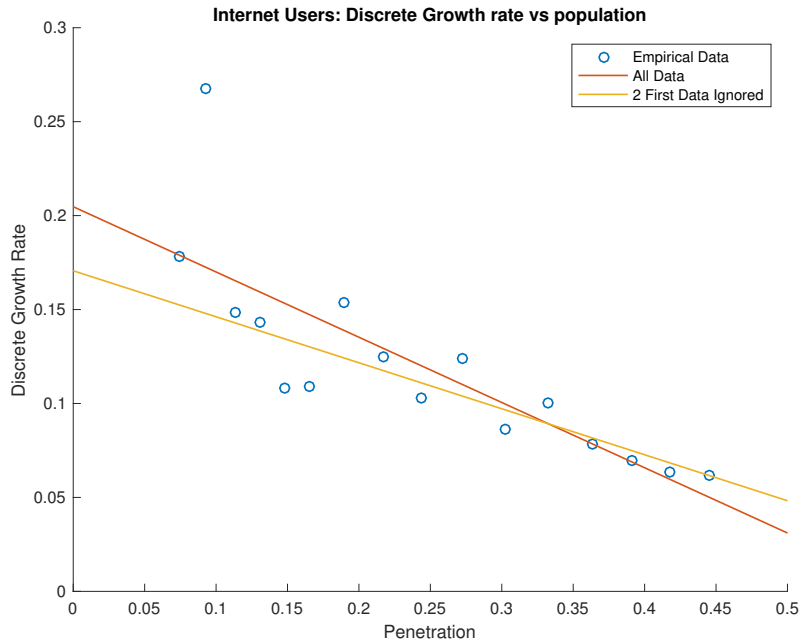


Figure 3.6: Discrete growth rate as a function of the normalized population penetration. Normalizing the data doesn't explain the plateau that the curve is forming. All data: $r = 0.2; K = 0.59$, Two first data ignored: $r = 0.17; K = 0.7$

case 10 years ago. Nevertheless, as it will be shown by the example of Facebook, taking into account the heterogeneity of growths for different regions doesn't necessarily increase the precision of the model fit.

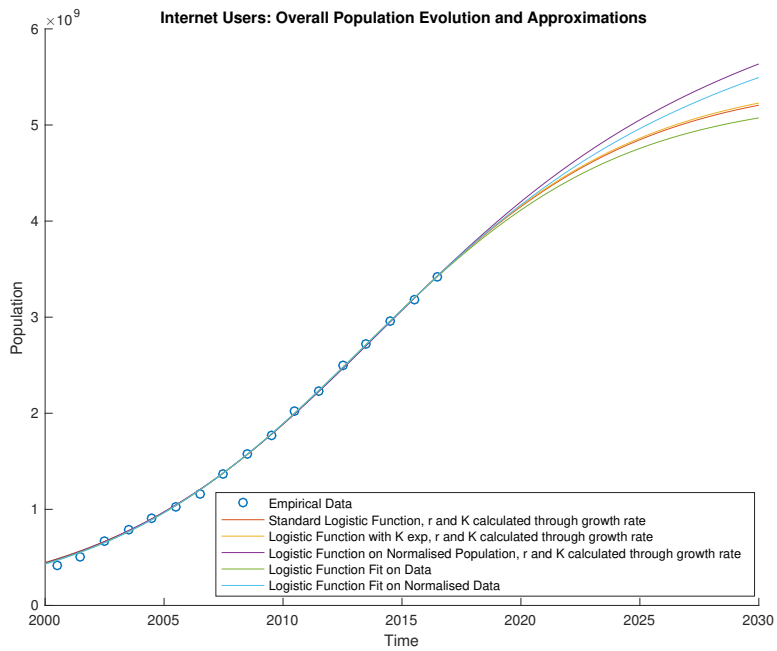


Figure 3.7: Illustration of the fitting difference with different assumptions. Allowing K to grow exponentially doesn't show an improvement. On the other hand, getting r and K for the internet penetration and then multiplying it by the world population smoothens the curve. Optimizing Logistic Function denotes the fit of the logistic function on the data, without calculating r and K by analyzing the discrete growth rate in the first place. The difference is minimal. All the R-Square obtained are $> 0.99$.

# Chapter 4

# Analysis of Grown-Up Unicorns

One problem Cauwels and Sornette faced in their work [43] was the lack of comparison for discussing Facebook's future income. In 2011, Facebook was a one-of-a-kind type of company. Nowadays, many companies followed similar paths. Here, we will use Facebook and Twitter, a similar company maturity-wise, to base hypothesis for examining Snapchat and Spotify. LinkedIn's revenue is also discussed. Nevertheless, no valuation will be made here. Valuing these two now big companies with a rather simple methodology like the one we are using is certainly too ambitious. Facebook's value is for instance not only dependent on its users, but also on Instagram's user base and future sales of Oculus Rift (a virtual reality company acquired by Facebook in 2014 [60]). But analyzing the evolution of their user bases and ARPU will help take right assumptions concerning Spotify and Snapchat's evolution. This analysis shows two very different user evolution, but highlights a trend in the revenue growth.

## 4.1 Facebook And Twitter User Growths

In this section,the in depth analysis Facebook and Twitter will be detailed. The two companies exhibit two extremes: in the first case, an example of a perfect growth and it the second case, an example of a predictably limited growth.

### 4.1.1 Facebook

Facebook allows people to interact with friends and other people,to share pictures, thoughts, articles or videos. It was, in 2016, the most popular social media worldwide, in term of MAU [16]. In 2011, Facebook was becoming the number one social media on the Internet. Back then, the discrete growth rate plotted with respect to the population appeared linear (see 4.1). Different aspects weren't taken into account, that made the projections made back then wrong:

- 1. The growth of Internet users
- 2. The popularization of smartphones
- 3. Facebook's technological improvements, increasing the target market

The growth of Internet users is important especially for a social media such as Facebook. Its penetration within Internet users is nowadays massive (about 35%) making the overall growth of Internet users particularly significant and of utmost importance in order for describing its evolution. Secondly, the popularization of smartphones gave a big push to Facebook's growth. It is on one hand linked to the general growth of internet users, because it provided whole new populations with a connection. The growth in smartphone use and mobile computing made in turn Facebook easier and more convenient to use, unrestricted to laptops and desktop computers.

Interestingly, the pattern of Facebook's growth started to diverge from the logistic function around 2011, influenced by the two reasons invoked earlier. Instead of heading towards zero, (as it had to be expected), it progressively stabilized around a value of 10%. The growth of Internet users and the rise of smartphones should be covered by normalizing the population by the overall internet users. In Figure 4.2, we see that the prediction is better but still flawed.

The last thing that should be accounted is Facebook's product evolution. Indeed, as it evolves, it seduces more people. The Facebook of 2011 is not what it used to be in 2016. This change reflects in the multiple ways the social media is used (for instance to chat, read news or watch videos), which wasn't the case years ago. It diversified to reach out to new segments of the population. This effect goes beyond the logistic curve.

The case of Facebook outlines the importance of additional factors. Two of the three identified are quantifiable and proved to improve notably the prediction. The successful product evolution hasn't been modeled here but probably contributes to the empirical values exceeding the adjusted prediction.

The heterogeneous growth between the World regions has been examined as a potential additional factor informing Facebook's growth[1]. However, it appears that it doesn't help to fit a logistic curve in a better way. Examining different regions separately shows that some regions have reached the saturation while others haven't. A regional analysis could determine to what extent the penetration is tending and help fine tuning the curve and obtaining better fits. This goes beyond the spectrum of this master thesis, due to the lack of data for emerging unicorns. Finding Facebook's optimal fit by analyzing each region in depth wouldn't help predicting the user growth of emerging companies.

[1]Facebook's case is convenient because it provides a large data set to analyze

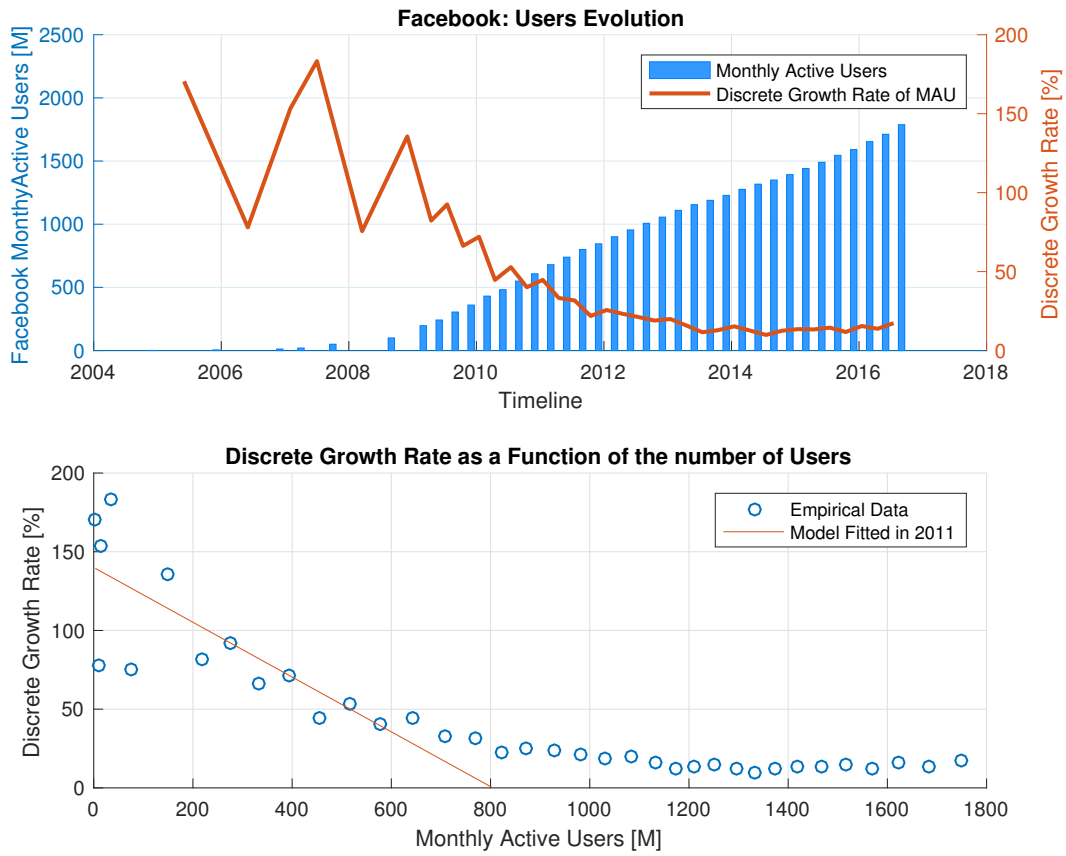


Figure 4.1: **a)** MAU and discrete growth rate evolution. **b)** Discrete growth rate fitted by a linear regression in 2011. Facebook's current situation is not even close to what was predicted in 2011 (red curve on the second graph). Impressively, FB managed to maintain a user growth rate of about 10%.

### 4.1.2 Twitter

Like Facebook, Twitter became a major social media. Twitter's main characteristic is that it provides a platform where people can share thoughts, pictures or articles and follow current trends or hot news via the so-called hashtags. It's major difference to FB is that it isn't a real directory. Sharing ideas is more important than sharing details about one's personal life (celebrities taken apart). Twitter's user base evolution is diametrically opposed to Facebook's and fits greatly the logistic curve, without normalizing the population, as Figure 4.4 shows. Calculating a linear regression on the discrete growth rate works here perfectly, as the data fits the logistic curve, with discrete growth rate forming a constantly decreasing line (linear regression: $R^2 = 0.89$ and logistic curve obtained: $R^2 = 0.99$).

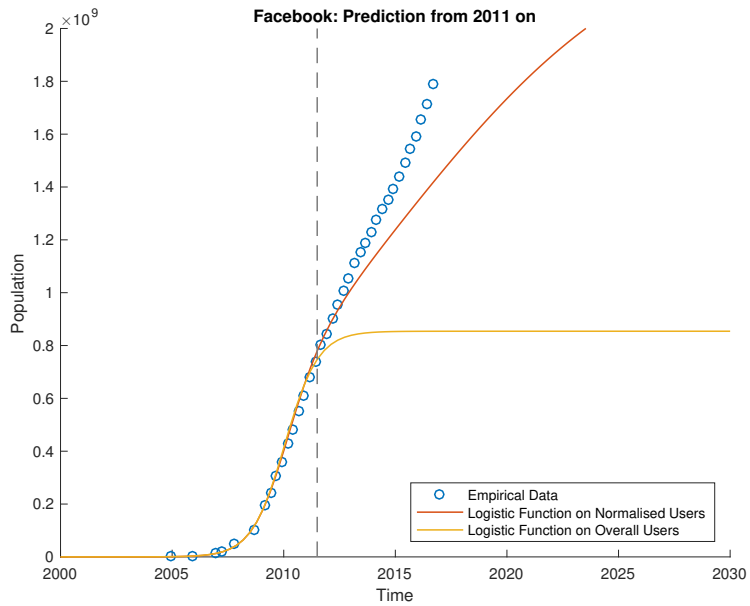


Figure 4.2: Facebook users evolution as it could be predicted in 2011. Clearly, the simple logistic curve under-estimated Facebook's potential. Normalizing the population corrects the prediction, but still doesn't give a perfect fit, highlighting Facebook's tremendous growth

In this case, taking into account the growth of Internet users helps retaining a plateau and not having a decrease of users. Indeed, Twitter's users curve clearly declines when normalized. However, it is difficult to know whether new users replace users leaving or if all the users simply stay on the social media, with very few newcomers. A way to answer this question is to analyze Twitter's announcement: consider that each day there are millions of people that come to Twitter to sign up for a new account or reactivate an existing account that has not been active in the last 30 days, as interestingly highlighted by the analyst Jan Dawson[11]. What may sound as an appealing announcement is actually an unsatisfactory news for Twitter. That means that at least 90 M users per quarter are new users or users coming back (in the statement, millions is written in the plural form, meaning at least one million times ninety days). Knowing that in the last quarter, Twitter added only four million MAU, that highlights that a lot of people are coming and leaving, showing the difficulties Twitter faces in retaining its users. The central aspect to explain this behavior is Twitter's lack of improvement and competition. This is a strong hypothesis, but Twitter's improvements were minimal, while FB included major changes (video viewing, live filming).

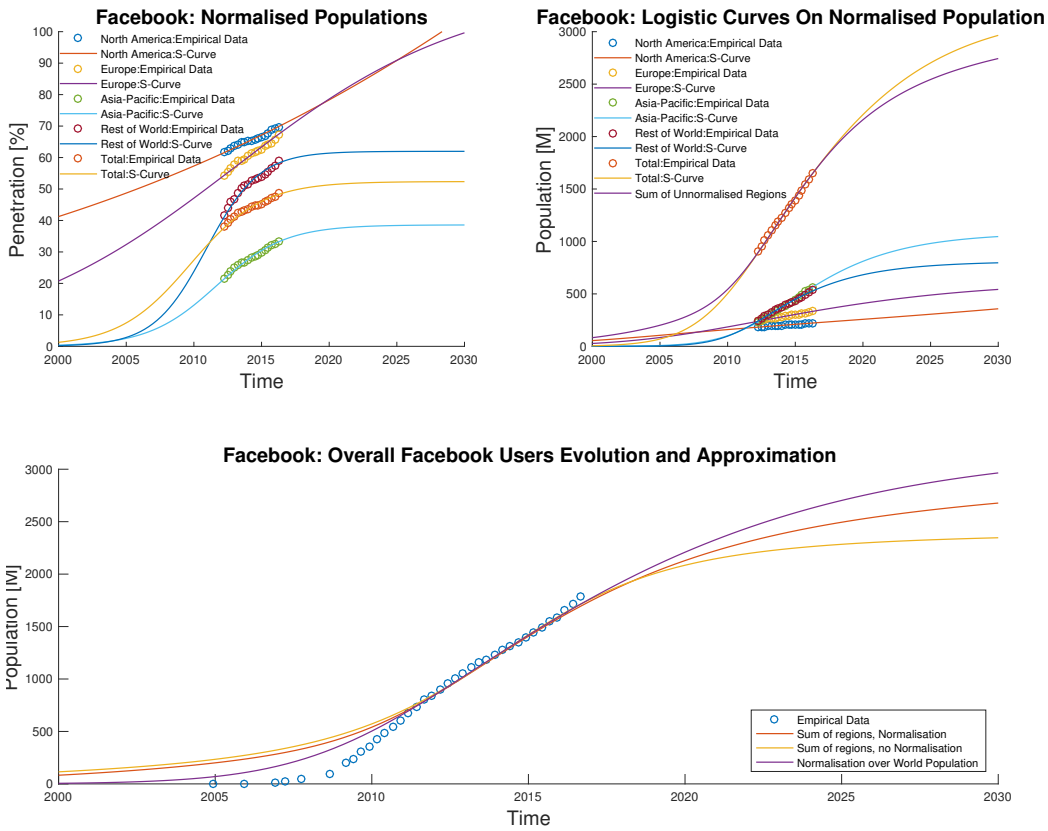


Figure 4.3: **a)** Logistic curve applied on normalized regional populations. **b)** Logistic curves obtained in a) multiplied by the regional populations. **c)** Sum of the regional model fits. The regional analysis doesn't help improving the fitness. Applying the logistic curve on each region in order to take into account the heterogeneity of diffusion doesn't give a better match than fitting the overall data.

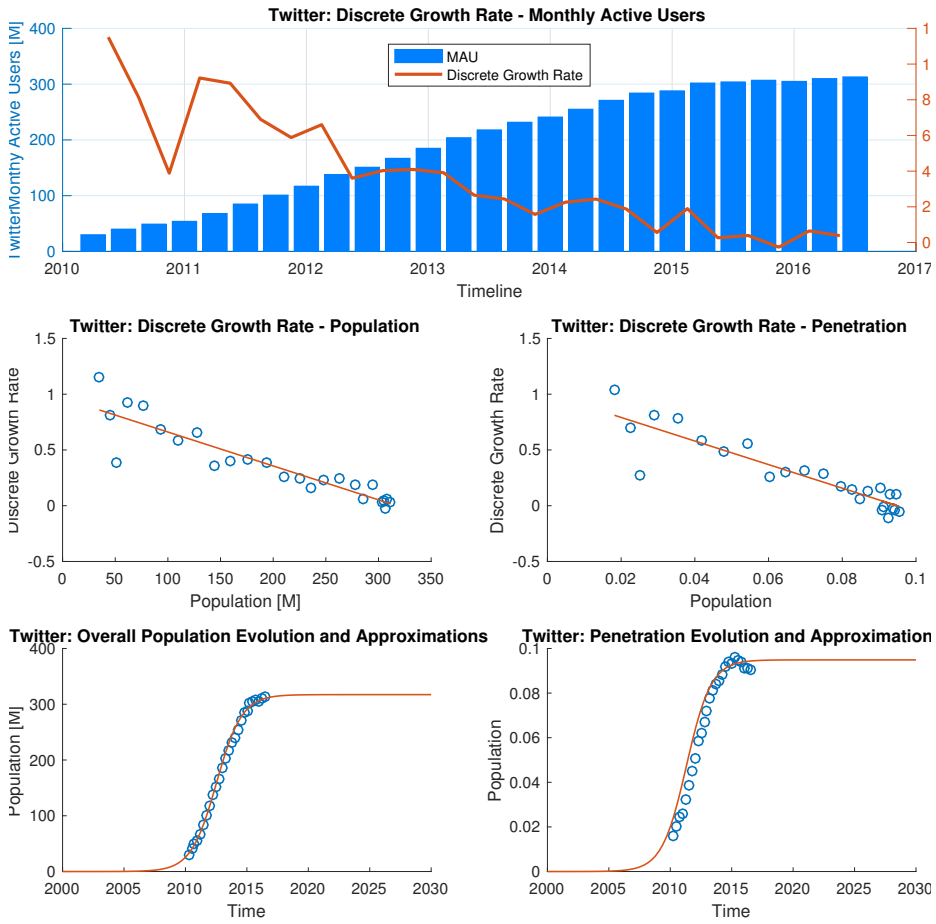


Figure 4.4: Twitter's user base evolution is completely different than Facebook's. By normalizing the population (graphs on the right), we even see the penetration decreasing. In this case, the logistic function fits perfectly.

Competition is certainly a key factor. Twitter is a more specific social media than FB, that especially seduces journalists, while FB, as said previously, is a proper directory that can benefit wide users' groups. Facebook evolved to convince a huge range of people, from teenagers to elderly, from housewives to politics. Facebook also copied Twitter by including the hashtags principle which can be referred as Twitter's trademark. Twitter's lack of evolution can be hypothesized from Figure 4.5. The predictions that could be done 3 years ago are still valid. The different regressions in the first graph are extremely similar. The contrast between this graph and Facebook's is striking: for Facebook, the regression was evolving into a flatter and flatter line, which is not the case here. The

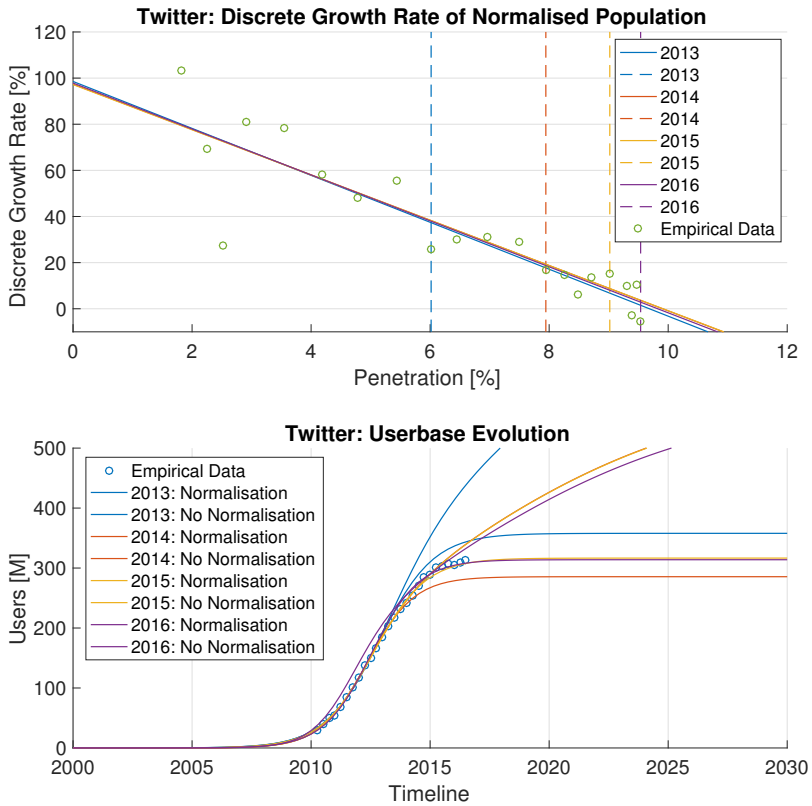


Figure 4.5: **a)**Twitter's discrete growth rate as a function of the population forms a perfect line, which is a bad sign because it means that the carrying capacity that could be predicted couple of years ago didn't change. $r_{2013} = 0.78; K_{2013} = 13.2\%; r_{2014} = 0.97; K_{2014} = 9.9\%; r_{2015} = 0.97; K_{2015} = 9.9\%; r_{2016} = 1.1; K_{2016} = 9.6\%$ **b)** S-curves obtained from different points of view in term of years. Taking the Internet users growth into account lead to too optimistic predictions.

carrying capacity that could be predicted 3 years ago remains therefore unchanged.

This analysis of grown up unicorns suggests that targeted product evolution allows reaching out to new market segments and drives growth. Furthermore, Twitter's case indicates that if a product doesn't evolve much, the growth will slowly decrease until all the potential people are interested. On the other hand, Facebook managed to improve its product to attract an ever growing part of the population. Facebook turned from a social media made for students into a tool for everybody: 13% of Facebook current North American users are over 60 years old [51]. Of course, not many products can attract all kind of people. However, it is notable that the product was shaped in order to fit

everybody. It became a very diversified tool that can be used in multiple ways. Twitter most likely isn't. This is therefore something that should be kept in mind while assessing the valuation of such companies. To calculate a net present value, it is assumed that the product will remain the same. Although clever improvements and diversification can increase the potential carrying capacity and therefore the company's value.

## 4.2 Revenue

Two important components are driving revenue in digital companies:

1. The user base.
2. The revenue per user or ARPU (Average Revenue Per User).

The user base evolution and characteristics have been described previously. ARPU is driven firstly, by the monetization or how well the platform manages to sell advertisement slots to publishers. Secondly, by the user engagement or in other words, the time spent by each user on the platform. The main metric is for describing users is the number of MAU. Nevertheless, there is a large gap between someone checking the platform ten minutes a month and ten minutes a day. In details, as mentioned by Jan Dawson, an analyst, the formula for the revenue is [10]:

$$Revenue = Users \cdot TimeSpent \cdot AdLoad \cdot PricePerAd \tag{4.1}$$

Such in depth analysis goes beyond the boundaries of this thesis, especially because precise metrics on time spent, ad load or price per ad are usually not publicly disclosed measures. However, these three factors are included in the ARPU and it is necessary to be aware of these components while discussing the evolution of the ARPU. After having given key elements of user base evolution, this section will discuss the ARPU and compare how well Twitter, Facebook and LinkedIn do. It will be concluded by a broader view on social media evolution.

### ARPU

ARPU is an indicator easily calculated, especially for public companies. It is calculated by dividing the quarterly (or yearly) revenue by the number of users (MAU generally) at the end of the period accounted. LinkedIn has been included in the comparison, although its business model is fairly different. It primarily makes money by providing valuable information to recruiters[29]. Ad sales is a secondary way of making money, unlike Facebook and Twitter. Nevertheless, it is worth mentioning that all three companies follow similar trends. The main question is whether there is an overall economical wave that pushes such businesses together or whether they are simply performing well at the same time. This question is important to answer, because it will give an idea of what a growing company (such as Snapchat or Spotify) can expect. In other words, will the company need to follow

the same path, or will it very quickly have an ARPU close to the other companies?

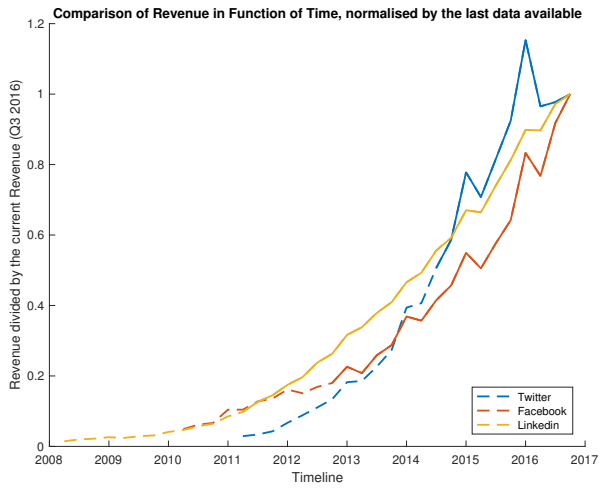


Figure 4.6: By plotting revenue over time of FB, Twitter and LinkedIn and normalizing it by their current revenue, one can observe their similar evolution although the three companies are different and went public at a different times. This could be a sign showing that there is an overall increasing interest in social medias. The dashed lines represent the period where the companies were private (before IPO).

In Figure 4.6, revenue normalized by the most recent revenue (Q3 2016) plotted over time for the three companies shows similar behaviors. Time is fixed, but the three companies are in different stages. LinkedIn went public in May 2011, Facebook one year later, in May 2012 and finally Twitter went public in November 2013. Although these companies don't have the same maturity, they've experienced very similar evolution of revenue. For instance, all three of them were making about 40% of their current revenue in 2014. The analysis can be pushed further, by dividing by the revenue at different times. Different evolution can be expected. In the case of Facebook, where the user base grows linearly, an exponential evolution is observed. Twitter's curve isn't linear, due to its decreasing growth of users. According to these two pieces of evidence, it is fair to say that the three companies manage to increase their monetization steadily.

The results for Facebook, Twitter and LinkedIn are summarized in Figure 4.8. Before analyzing these results more in depth, interesting observations can already be made at this stage. Firstly, all companies have peaks, especially in Q4 for Facebook and Twitter, which is something common for ad companies [12].

Secondly and most importantly, they seem to follow the same pattern. This is especially the case

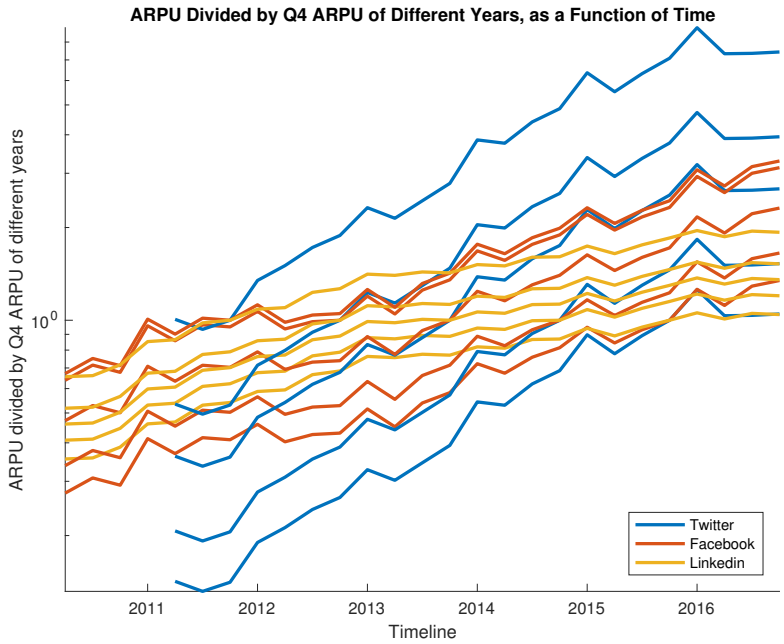


Figure 4.7: ARPU divided by the last quarterly ARPU of different years (2011-2016), plotted on a logscale. Twitter and Facebook both show an exponential growth in ARPU, while having completely different growths.

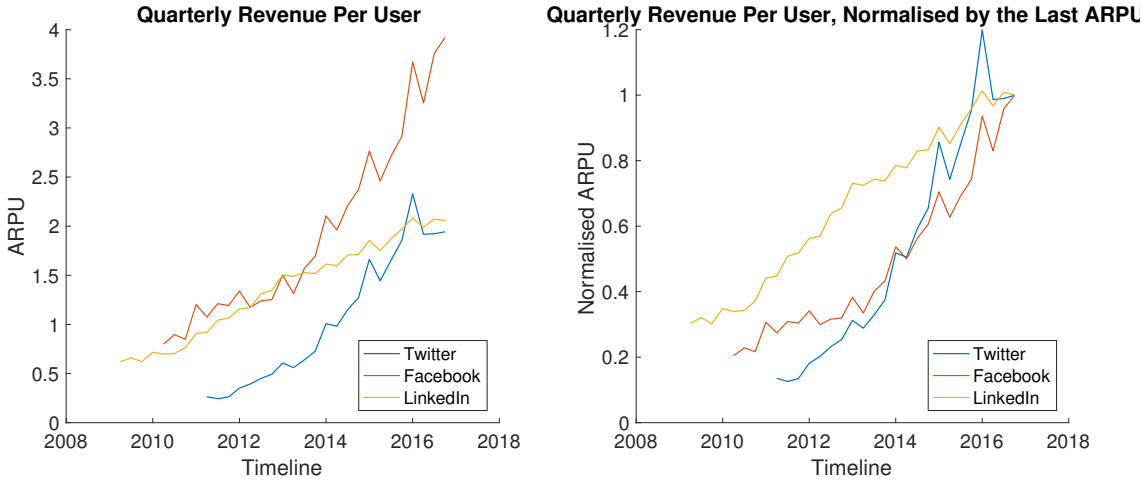


Figure 4.8: Current situation of the ARPU for Facebook, Twitter and LinkedIn. Although the three companies are different and have different user bases, revenues follow the same tendency.

for Facebook and Twitter, whose curves look the same with the exception of a two years delay. Although they look the same, the ARPU are driven in different ways. Facebook's late growth remained

steady (or even increasing) because of Instagram's contribution [21]. Indeed, from September 2015 on, Facebook's latest huge acquisition started generating revenue at a growing pace. The problem is that Facebook is rather non-transparent with respect to Instagram's share of revenue, it is therefore not possible to separate the two of them. Nevertheless, it is likely that Facebook's ARPU's growth in the last year and a half is linked to Instagram. Twitter on the other hand, managed, surprisingly, to grow its revenues at an impressive pace (considering its decreasing database). This means that it monetization is growing, considering its rather stagnant user engagement and decreasing user base [12].

Facebook and Twitter show promising growth of ARPU. Furthermore, this growth is probably not going to slow down in the foreseeable years. Indeed, if Facebook had an annual ARPU of $12, its ARPU for the second quarter of 2016 passed $50 for the North American market [9]. This means that there is potential growth possible in the other regions of the World.

# Chapter 5

# Spotify

## 5.1 Description

Spotify is a Swedish music streaming service launched in 2008 [54]. Spotify provides its users the possibility to listen to songs from a large catalog by streaming them instead of buying them, which represent a major switch in how music is consumed.

Spotify operates with a freemium business model, which is a new way of monetizing the music. On one hand, one can use Spotify for free with many limitations - such as having advertisements, not being able to choose freely the song to listen to, no "offline streaming" etc. On the other hand, for $10/month (price varies from country to country), the user can access the Premium tier, without any limitations nor advertisements.

Spotify's sources of revenue are mainly:

1. Advertisement that non-paying users see
2. Subscription paid by every Premium users ( $10/month)

Spotify is valued at $8.53 B after its last $1B raised in convertible debt [55]. This last round didn't technically change Spotify's valuation but showed signs of an upcoming IPO because "if Spotify holds a public offering in the next year, TPG and Dragoneer will be able to convert the debt into equity at a 20% discount to the share price of the public offering, according to two people briefed on the deal" according to the Wall Street Journal, in March 2016 [34]. Furthermore "after a year, that discount increases by 2.5 percentage points every six months", said the aforementioned sources. In other words, the longer Spotify waits to go public, the cheaper it will be forced to sell its shares to the last round's investors. Many analysts think that the IPO will take place in the second semester of 2017 [40].

## 5.2 Financials and User Growth

Before the evolution of Spotify's user base, their financials must be analyzed in order to understand how valuable each kind of user is and therefore, what metric is most relevant to use. Figure 5.1 gives an overview of Spotify's annual financial situation, from 2012 to 2015. While its revenue is growing rapidly, costs evolve at similar pace. To see how Spotify is planning to turn its business into a profitable one, revenue and then costs are analyzed further.


Figure 5.1: Overview of Spotify's financial situation. Spotify's costs are above their revenues and it is not likely they will be able to reduce them in the foreseeable future [1].

### 5.2.1 Revenue

Figure 5.2 shows that approximately 90% of the revenue is generated by the 35% of premium users paying monthly fees. Two important things can be concluded at this stage. First, a disproportionate portion of Spotify's revenue comes from premium users. Indeed, Spotify, earns roughly €85/year [1] per premium user and only roughly €2.5/year per free user. As a reference, Twitter has a yearly ARPU of about 10$/year. The ads shown in Spotify are very invasive. They are of course way different than Facebook or Twitter that manage to target ads specifically to your taste and which are less interfering. Furthermore, Spotify is far from having a monopoly (unlike Facebook and Twitter in their own kind of service). Increasing the amount of advertisement could therefore easily push users to switch to a competing platform or way of listening to music. Considering this, it will be very challenging for Spotify to increase their ARPU through advertisement revenues.

The second important key point is that, although its user base is growing steadily, Spotify has

[1] As it is explained and calculated in section 5.3 concerning the valuation), it isn't equal to the monthly rate (€10) times 12 because the monthly rate is different from country to country and because Spotify's offers family deals and promotions that decrease this revenue

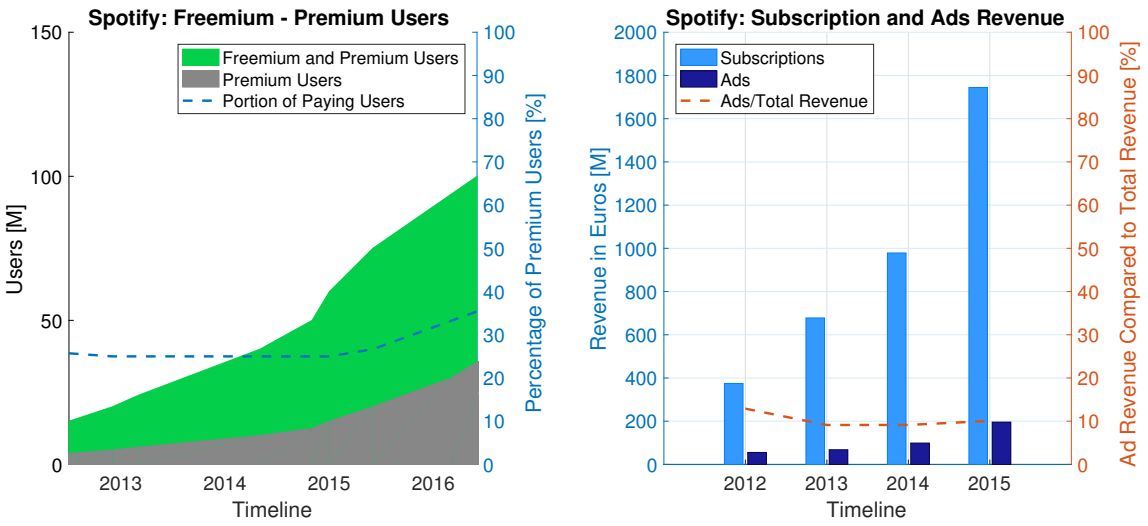


Figure 5.2: The rather steady share of premium users compared to freemium users is shown in the left plot. On the right plot, the money earned from subscription and ads is shown. Spotify depends on its minority of premium users for revenue and isn't able to monetize efficiently the freemium ones.

been unable to raise their percentage of paid users. Although it lately lately grew to surpass the threshold of 30% of all users being premium, it isn't an easy task for Spotify, for whom a premium user is more valuable than a free user. It is impossible to speculate what part of the free users would accept to pay if it were no longer possible to use it freely or if the ads became too invasive.

For those reasons, paying subscribers will be considered as the key metric for Spotify's valuation, because they are the key driver of Spotify's revenue.

### 5.2.2 User growth

Data about Spotify's premium subscribers are available from July 2010 to September 2016 and can be found in the appendix 7. Unlike the MAU or the DAU, measuring the number of paying users is very straightforward, which makes the data reasonably trustworthy. Although the data comes directly from Spotify, cheating on this crucial data would have disastrous consequences for the company's image with investors. Spotify obviously isn't the same nowadays as it was six years ago and the challenge here is to analyze what range of data will be taken into account. One way to do it is to fit a logistic curve to all the points, and then delete the first points one by one by applying a logistic fit and while analyzing the evolution of the R-Square.

Considering Figure 5.3, it is clear that Spotify had different regimes. These purely statistical observations can (and should) be backed up by evidence from Spotify's evolution as a product. The

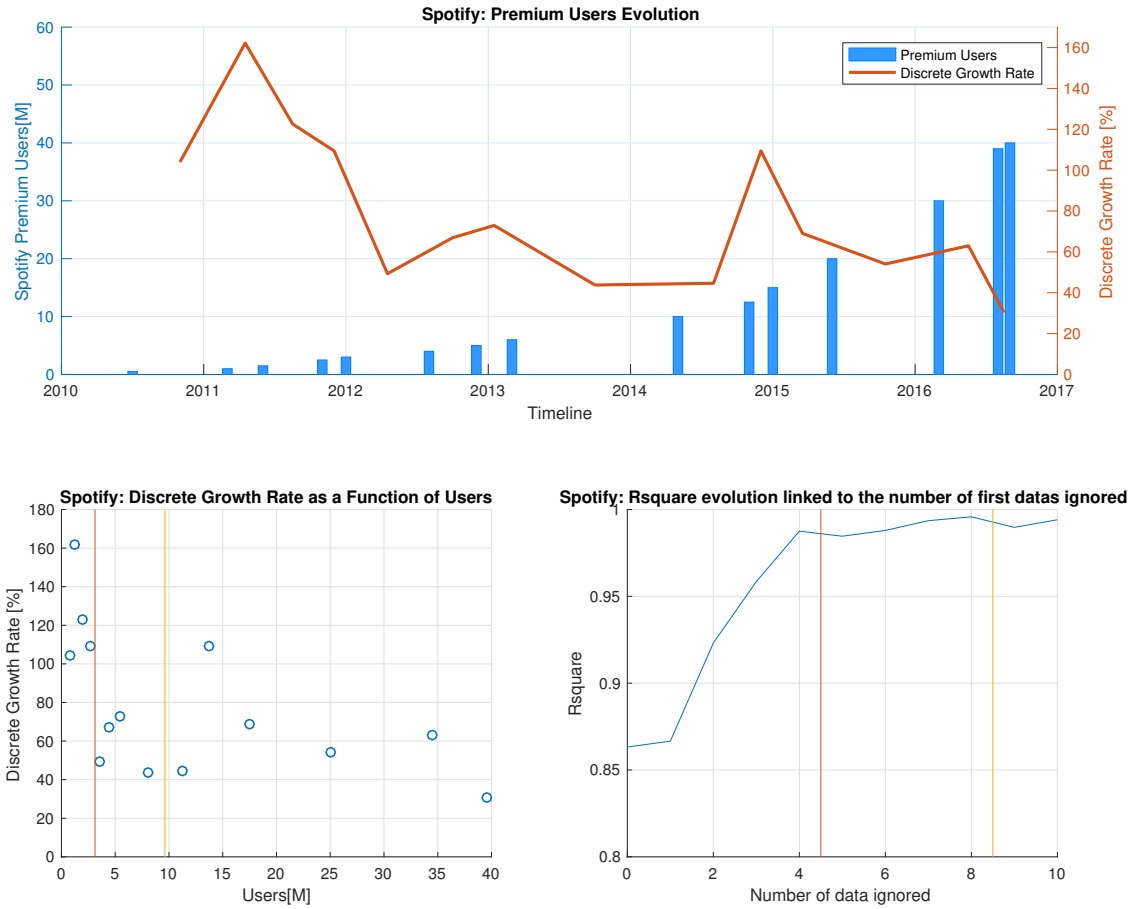


Figure 5.3: **a)**Overview of Spotify's user evolution. **b)** Discrete growth rate as a function of users. **c)** Logistic function fit's R-square evolution as a function of the number of data ignored. The first four data can be ignored, since they are not relevant for the Spotif'y current situation (time when the discrete rate boomed). Furthermore, there is a second R-Square peak at eight points ignored. It is certainly not as clear as the four first ones.

four first points are from July 2010 to November 2011. In July 2011, Spotify was launched in the US (being limited to Europe beforehand)[50]. This is a major milestone, because US's scalability power is huge compared to Europe's (because it is a big unified market unlike Europe which is divided by borders, languages or currencies). The growth rate would most likely have been very different without an expansion to the US. This justifies ignoring the four first points. The fourth data is in November 2011, one could argue that this shouldn't be part of the first regime because it's after the US's introduction. The counter argument is that the evolution takes a while to happen and it is

likely, in respect to the R-Square calculations, that this point doesn't belong to the same regime as the forward data.

There is then a data singularity with the four following points, since there is a gap of over one year between March 2013 and May 2014 (the eighth and the ninth point). Since it is unsure what happened in those years, scenarios will be considered by taking them out as well.

Different scenarios will be based by ignoring four and eight points. Spotify's future evolution of user growth is uncertain because unlike the companies analyzed previously, Spotify didn't start in the US. Scaling is easier in the United States due to the country's homogeneity, which is an advantage for companies starting there. Europe has many barriers such as language, currencies or culture. Furthermore, the halo effect generated by success in the US is certainly considerable for future growth. Indeed, a successful app in the US will very likely be able to conquer the rest of the world because of US's supremacy in IT (although for this the causality isn't clear). This snowball effect is definitely not the same the other way around (namely, when the growth starts in Europe). Due to these facts, the growth of Spotify is rather steady for a couple of years now (it started peaking in Europe and then peaked in the US) it is therefore unsure what will happen next based on those growth rates because the pattern isn't the same as Facebook's or Twitter's.

Another problem for Spotify is competition. Apple music, that was launched in summer 2015 has already half as many premium users as Spotify. Pandora, which is a slightly different product than Spotify.Pandora is a web radio offering recommendations based on the user's musical taste that went public in 2011 in the US. These different competitors threaten to limit Spotify's carrying capacity. On the other hand, new competitors may also mean a raise of interest from the consumer side and therefore make more people interested in paying for such services. Optimistic growth scenarios will be considered here, because if the growth doesn't follow those patterns, Spotify will most probably disappear by being bought by a competitor. This may be a big assumption, but several companies are now proposing very similar services as Spotify. It wouldn't be surprising to see fewer "survivors" in the upcoming years. Indeed, Spotify's market power still isn't strong enough, meaning that the opportunity cost for a Spotify user can easily be higher than the changing cost. Which isn't the case for a company such as Facebook, that has a huge network effect, limiting users moving to competitors (because it would require having friends moving along).

Three different scenarios will therefore be considered:

1. A slow growth scenario, where the S-Curve isn't calculated by accounting for the overall growth of internet users and where only the four first points are ignored, assuming that Spotify has the same regime since 2013. For this scenario, a regression on the discrete growth rate will be

done.

2. A medium growth scenario, where the overall growth of internet users isn't accounted but where the eight first points are ignored. The logistic function is found by fitting it directly to the user data.

3. Finally, an extreme growth scenario, where the eight first points are ignored and where the overall growth of internet users is taken into account. The logistic function is found by fitting it directly to the user data.

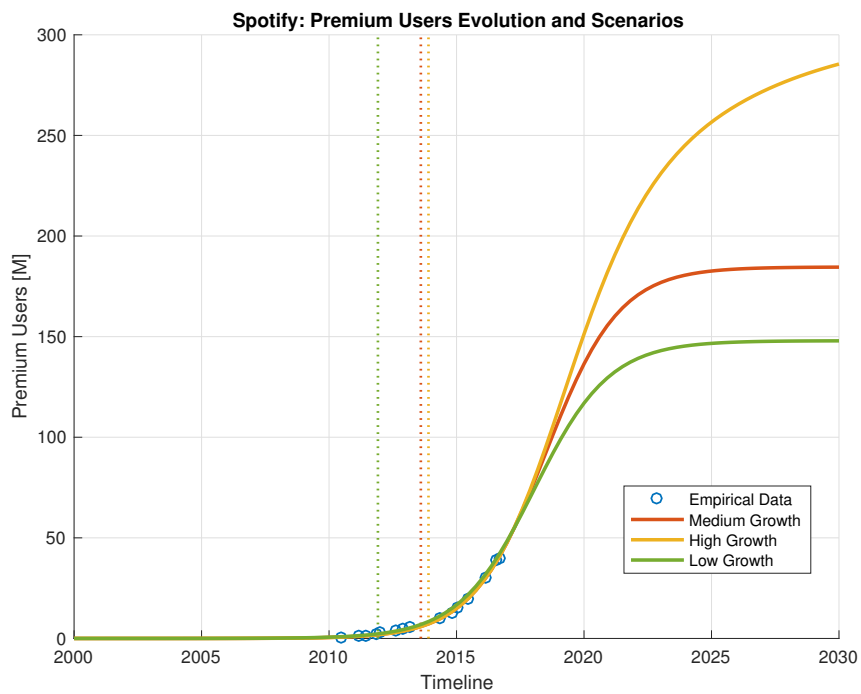


Figure 5.4: Three scenarios (low, medium, high) of growth are used to predict Spotify's future evolution.

It is important to bear in mind that even the low growth scenario is optimistic. Indeed, a report from an investor of Spotify[42], states that they predict 100M users in 2020. No details on their methodology can be found, but this is arguably an optimistic prediction since they invested in them. The three scenarios are plotted in Figure 5.4.

### 5.2.3 Costs

Now that the different scenarios for Spotify's future growth have been determined, expenses must be assessed. This is a key point (if not *the* key point) to determine Spotify's (potential)

profitability. Spotify has a considerable cost of revenue: more than 80% of the revenue represents costs in royalties and distribution. As a comparison, Twitter's and Facebook's selling, general & administrative expense (which include direct costs as cost of revenue and indirect costs as marketing) are, respectively 55% and 25% of the overall revenue[2].

| Year | Revenue [$ M] | Cost of Revenue [$ M] | Cost of Revenue / Revenue [%] |
|---|---|---|---|
| 2012 | 430.3 | 376.4 | 87 |
| 2013 | 747 | 602.9 | 81 |
| 2014 | 1'082 | 882.5 | 82 |
| 2015 | 1'945 | 1'633 | 84 |

Table 5.1: Spotify's revenue and costs from 2012 to 2015. Spotify's major issue is its costs of revenue, which are primarily royalties that are paid to major record labels. They remain steady over the years at an average rate of 83%.

The problem therefore for Spotify is that this cost of revenue have been constant throughout the last years and most probably won't decrease, because of the current state of the music industry. These costs are due to Spotify currently paying back a certain amount of money per song to the major record labels, as related in [35]: "the broad average from the information posted online is about $0.004 per stream, 0.4 or 0.5 cents per stream, although streams get different rates of return according to a variety of factors, most notably whether it is played by a subscriber or someone using the free service".

The first assumption is that 83% of Spotify's revenue will be cost of revenue which will remain constant. This could even be seen as an optimistic assumption, assuming Spotify's competition growing, thus offering major record labels bigger bargaining power. The goal is therefore to scale sufficiently so that the 17% of revenue left becomes large enough to cover the marketing, R&D and administration costs and reach profitability.

## 5.3 Valuation

As mentioned previously, Spotify's latest valuation is $8.53B [55]. Different scenarios will therefore be imagined in order to see how well Spotify will need to perform in the following years to achieve this current valuation. It must be remembered that this valuation has been set almost one year prior to this evaluation, meaning that the current valuation is likely to be higher considering last year's growth in users.

With the three growth scenarios, the user growth is calculated for the coming years. The ARPU is

[2]Average made from the income statements from 2012 to 2015[39][38]

still to be calculated. Calculations that can be found on the internet divide the subscription revenue of a year by the number of premium user at the end of this year. As users are asked to pay on a monthly basis, the calculations should rather be done with the number of users in the middle of each year because people subscribing during the year in question won't have payed a full year. This way, an average of the year is taken. Results can be found in Table 5.2. To be on the high side, €100 will be taken as an ARPU. The latest decrease in Spotify's revenue is due to promotions (free trial, 50% off for students or family packages). Furthermore, the number of premium users in June of each year must have been interpolated from other data causing certain imprecision in the data.

| Year | Sub. Revenue[€M] | Premium Users[M], January | ARPU[€] | Premium Users[M], June | ARPU[€] |
|---|---|---|---|---|---|
| 2012 | 374 | 5 | 75 | 4 | 94 |
| 2013 | 678 | 8 | 85 | 7 | 97 |
| 2014 | 978.57 | 15 | 65 | 11 | 89 |
| 2015 | 1744 | 28 | 62 | 20 | 87 |

Table 5.2: Calculation of the revenue per premium user (ARPU). The revenue coming from the subscriptions (Sub. Revenue, second column) is divided by the number of users (Premium Users in million, third column). Obviously, the results differ whether we take the number of users at the end of the financial year or in the middle of the year.

### 5.3.1 Scenario 1: Fixed profit margin on revenue from subscriptions

The most basic scenario is that Spotifys profit margin remains constant from 2017 onwards. The calculation is in this case rather straightforward. As with our aforementioned assumption, the ARPU is €100. Spotify's annual revenue is therefore the number of users in June multiplied by 100. The second assumption is that Spotify's ads revenue generates 10% of the annual revenue. The annual revenue from subscriptions is therefore multiplied by 1.11.

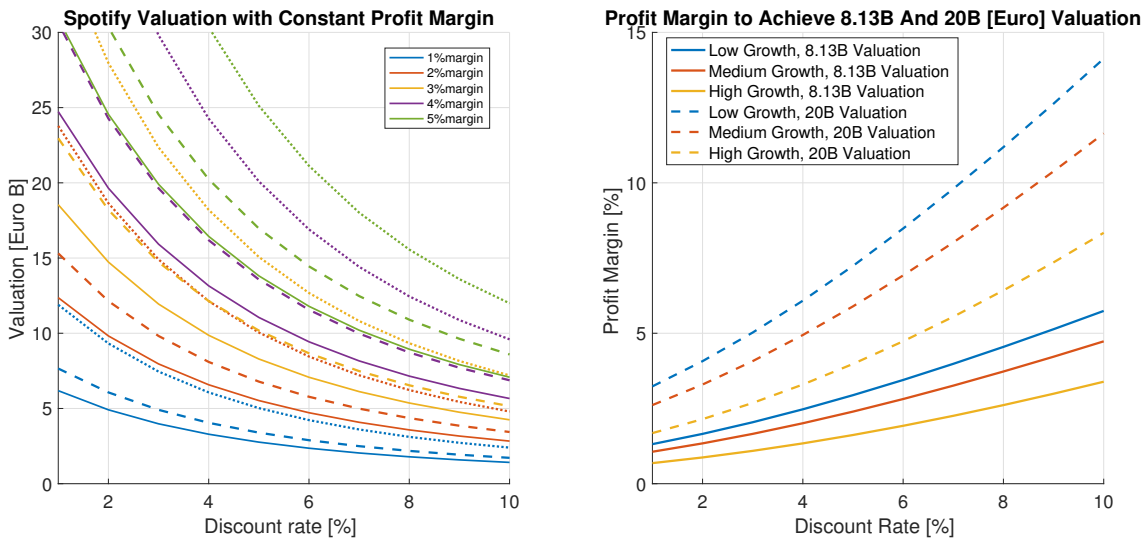


Figure 5.5: **a)** Valuations with hypothetical profit margins. The different line styles represent different growth modes (plain: low growth, dashed: medium growth, dotted: high growth). **b)** The question "What should be the future constant profit margin to achieve €8B or €20B valuation?" is answered. Dashed lines represent profit margin that should be achieved for a $20B valuation. Spotify's valuation is surely based on high expectations, considering the optimistic assumptions that were taken for those predictions.

Figure 5.5a) illustrates the main information gathered from this very simple scenario. Clearly, if Spotify manages to quickly achieve even a minimal profit margin (2% for example), its value could skyrocket. Figure 5.5b) highlights the profit margin Spotify should achieve in order to its meet current valuation. For a discount rate of 5%, Spotify should have a profit margin between 2% and 4%, which isn't excessive considering other companies' profit margins. As a matter of comparison, Netflix's profit margin fluctuates between 1% and 5%. The problem remains the same: Spotify will have to change something in its business model to fulfill this profit margin, because considering the available data and even optimistic assumptions on costs evolution, a profit margin (even small) will

be hard to achieve.

This very simple scenario gives already very interesting insights about Spotify.

### 5.3.2 Scenario 2: Ads revenue increases

**Assumptions**

For Spotify to reach profitability, the following is conceivable:

1. The first option would be to decrease the costs of revenue. As discussed previously, this will be very complicated to achieve due to the pressure coming from major record labels and their bargaining power. Spotify can't afford to decrease this margin because it can't afford losing artists now that the main focus is put on user growth.

2. The second option would be to reduce other costs. To imagine to what extent the costs could be reduced, analyzing costs of a similar company offers a good benchmark. Netflix is probably the most similar company. They propose video (movies, tv shows) streaming for a fixed similar monthly subscription. Netflix has also therefore to pay big royalty fees. Netflix's income statement of the two last years is shown in appendix C.1. Netflix's cost of revenue is firstly much smaller than Spotify's. Other costs represent roughly 25% of its annual revenue, which is also Spotify's case for 2015. It would be therefore complicated to imagine that much improvement could be done here, especially considering Spotify's current need for growth (thus high costs in marketing and R&D).

3. The last option would be for Spotify to manage to increase the annual ARPU of advertisements. This is unlikely with the current product and business model, considering the evolution of it in the last years but definitely the most realizable option of all three. Increasing the ARPU on premium users could also be an option but it would require a raise in subscription fees. This may lead to a decrease of premium user growth, which is certainly not Spotify's goal.

| Year | Revenue [€M] | Cost Of Revenue [€M] | R&D [€M] | Sales and Marketing[€M] | Gen. and Admin[€M] |
|---|---|---|---|---|---|
| 2013 | 747 | 614 | 72 | 111 | 40 |
| 2014 | 1082 | 876 | 121 | 173 | 77 |
| 2015 | 1945 | 1624 | 143 | 246 | 116 |

Table 5.3: Spotify's costs

For this scenario, the following assumptions will therefore be taken:

- The ARPU for subscriptions remains €100, which is on the high side.

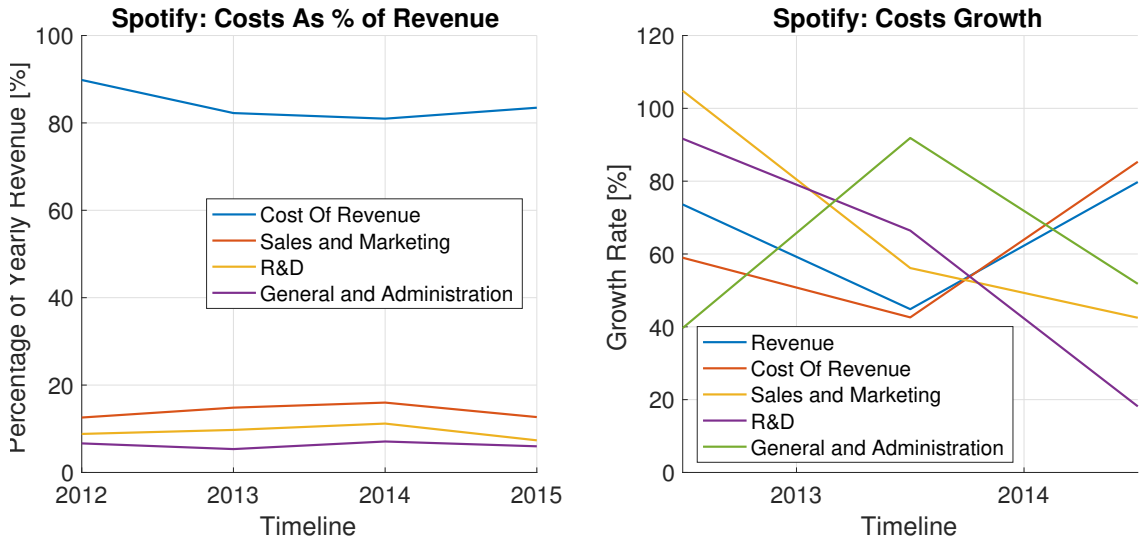


Figure 5.6: Evolution and importance of Spotify's different costs. As explained in subsection 5.2, costs of revenue are directly dependent of the revenue. Other costs aren't as strongly correlated.

- All the costs represent 105% (80% of costs of revenue and 25% of remaining costs) of the current revenue ratio (90% subscriptions, 10% advertisements).
- Free users represent 65% of overall users.
- Free users are multiplied by a factor to represent the money earned with advertisement.
- The increase in ARPU happens starting from 2017 and is constant over the following years.

The objective here is therefore to observe what increase of advertisement ARPU should be done to achieve profitability and therefore a reasonable valuation.

### Results

This simulation shows that profitability is reached from an ARPU increase of €2 for the low growth and €1 for the medium and high growths (see Figure 5.7). It is important to note here that the increase in ARPU doesn't mean an increase in subscription fees, rather an increase in overall revenue (including advertisement revenue). Those results can be considered as positive for Spotify, because it shows that a business model improvement would lead rather quickly to profitability. Nevertheless, all the assumptions taken for this simulation were optimistic. These results should be taken as a valuation increase.

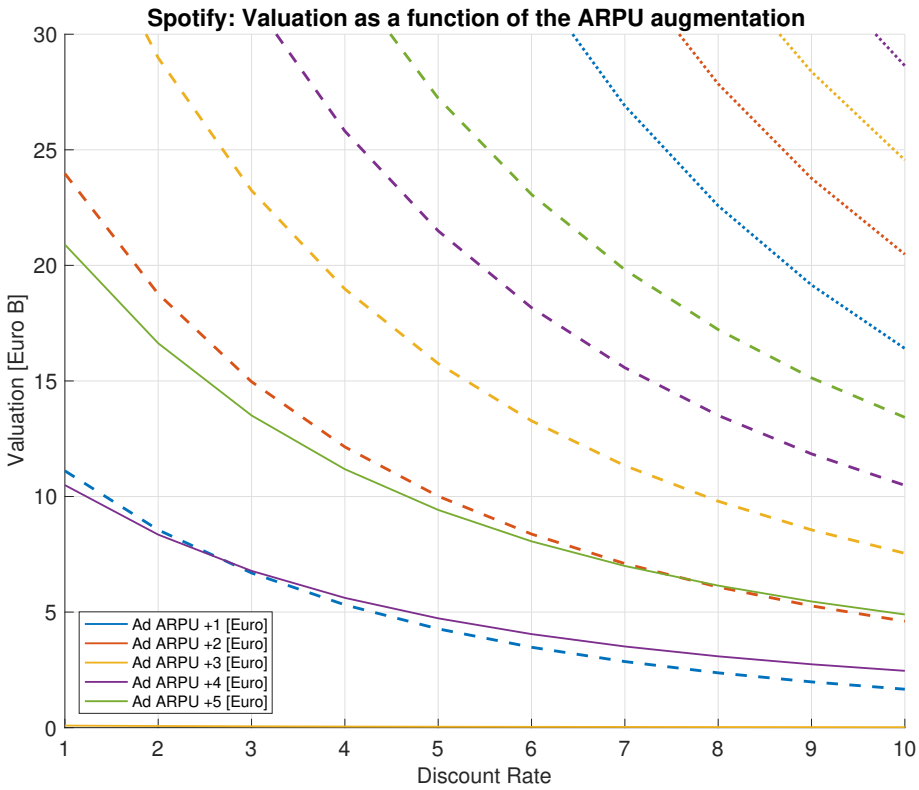


Figure 5.7: As for the first scenario, the plain lines represent the low growth, dashed lines the medium growth and dotted lines the high growth.

## 5.4 Conclusion

The results obtained for the two scenarios can be compared with a report from GP Bullhound, an investment banking firm, that holds a stake in Spotify [42].

1. They assume an ARPU of $89/year (€83), which is almost 20% less than the assumption taken in this thesis's scenarios (i.e €100/year).

2. On the other hand, they assume that the advertisement ARPU/year will be $10-$14 which is very optimistic. This is higher than Twitter's and Linkedin's current ARPU, which makes this assumption questionable. It would require a major improvement in Spotify's business model to achieve such numbers.

3. In our scenario, the assumption for ads was very simplified, saying that it will remain 10% of the overall revenue. This supposes that the percentage of free user will remain the same and so will the ARPU. GP predicts that in 2020, only 33% of all users will be paying subscribers. This is also surprising, due to Spotify's clear goal to have more paying subscribers. It would mean

a switch from subscription to advertising, leading to an advertisement revenue representing 18.4-20% of the overall revenue.

4. The gross margin is between 28% and 30%. This is again very optimistic considering Spotify's current issues to reach profitability. No details is given on how the cost of goods sold is being reduced.

This analysis predicts a substantial growth of advertisement revenue. Improving monetization on advertisement can quickly lead Spotify to profitability, as illustrated in Figure 5.7. As GP Bull is a Spotify's investor, it most certainly has insights of the upcoming plans for business development. A strategic move or improvement is needed, as explained previously, and this report backs this up.

Such analyses are interesting to take into account but, unlike the approach we are proposing, it is based on financial ratios (namely, on the EV/EBITDA ratio). The main problem of such methodologies, widely used by financial advisors, is that they are highly biased by the financial context and environment. Instead of calculating the intrinsic value of a company, the value is speculated based on how similar companies are valued on the stock market. The advantage of doing as such is that one can make short-term guesses about the evolution of stock prices. Nevertheless, if the industry in question is in a bubble, nobody will see its burst coming because at no point the intrinsic value is calculated.

# Chapter 6

# Snapchat

## 6.1 Description

Snapchat[1] is a social media company started in 2011. It allows users to send and receive pictures on mobile devices. Unlike Instagram and the other social medias where pictures are stored and always accessible, Snapchat's main attribute is that pictures can be seen for a short time only (from a couple of seconds to a day). It evolved into a mix of private messaging and public content, including brand networks, publications, and live events such as sports and music.

A user can, once a picture is taken with the app, post pictures in two different ways. The first is to send it to selected friends. The user can set how long his picture will be visible (1 to 10 seconds), add filters to it, write and even draw on it. The ephemeral dimension is Snapchat's key value proposition. It differs from other social media in that it allows users (mainly teenagers at the beginning) to send pictures without fearing the backfire of seeing them published publicly. In May 2014[13], Snapchat increases its functionality by adding text messages and video chat. The principle remains the same: users can send texts that disappear once they are read by the receiver.

The second way to use a picture is to add it to the user's "story". The picture will then be visible for 24 hours for all of the user's friends. This function appeared later (in Fall 2013) and allowed Snapchat to attract celebrities and reach a more diversified public. Users had from then on the possibility to follow celebrities and be able to see what they post on a daily basis. This functionality became very quickly a key characteristic. First, because users reach more people with their pictures and videos (no need to individually select people to send the picture). Secondly, because it pushes

[1] Although Snapchat was renamed to Snap Inc. in September 2016, it will be called Snapchat in this thesis for clarity

people to come back every day to see people's story, because it vanishes after 24 hours. This dimension differs from the regular social media that one could open once a week and be updated with everything they missed. It makes Snapchat a very interesting advertisement medium since users have a direct interest to use it on a daily basis.

Snapchat's last key feature is its Discover function, which was introduced in January 2015 [8]. It allows user to watch content from an ever growing list of major media publishers (such as CNN, ESPN, etc.). This feature is essential in Snapchat's monetization process, as detailed in the revenue analysis (section 6.3). Snapchat's business plan is to leverage its growing user base and their interactions to sell advertisement in diverse forms[44]:

1. Advertisement in form of videos or pictures, placed in between "Stories" of popular users or in publishers' content.
2. Sponsored "Geofilters", filters that users can use to modify their pictures.
3. Sponsored "Lenses", effects aiming at transforming the user's face. Taco Bell for example created a sponsored Lens turning the user's face into a taco, resulting in 224 million views in one day for the fast food company[26].

Snapchat became Snap Inc. in September 2016 to emphasize that they offer more than an app [53]. Glasses equipped with a camera were indeed launched to allow users to record videos without having to hold their smartphones. This product is mostly "a toy"(as called by Snapchat's CEO) and its revenue will most probably be limited relative to that of advertising revenue[53].

## 6.2 User Growth

Daily active users will be taken as the key metric for Snapchat, because it is the most reliable indicator of Snapchat's growth, due to a leak in Snapchat's confidential documents [33] or information given directly by Snapchat. Snapchat's user growth is unique because the product evolved differently than the other examples discussed until now. Before the "stories" appeared, Snapchat was a very successful app among teenagers willing to safely share pictures. Nevertheless, the carrying capacity was rather limited because adults weren't interested in it. It is of course an assumption that the implementation of the "stories" marked a switch in the app usage and in the opinion people had about it (nobody could know whether it would still reach a larger audience). The fact is, it slowly became an app that was no longer seen as exclusively teen, but more and more as an alternative to social media channels in place.

In November 2013, Facebook offered $3 billion to acquire Snapchat, which was refused by Snapchat's

CEO[45]. This has been undoubtedly a major advertisement for Snapchat, while people started wondering how such a company, that wasn't making any revenue at that time, could refuse such an offer. These two major events most probably contributed to Snapchat's steady and regular growth from early 2014 on.

This switch of growth can be compared to Facebook's. Facebook was a product first, driven by PC users and then saw the beginning of a "new S-Curve" driven by the smartphones users. It must be highlighted here that those are assumptions explaining the curve observed. Other factors could have caused them and the causality is difficult to prove. Data before 2014 will therefore be ignored for the user growth prediction because they correspond to the growth of a product that isn't the current Snapchat app anymore . However, those assumptions must be taken carefully, because data before March 2014 comes from Business Insider, that calculated the MAU which was then approximated into DAU. The approximation is made by calculating an average DAU/MAU ratio on the available data, and multiplying the MAU by this ratio.

Finally it can be observed that Snapchat experienced a major rise in user growth in May 2016. Indeed, the DAU rose from 130 million in May to 150 million in June. Many factors can explain this. In June, Snapchat's name changed in Snap Inc. with the launch of their glasses. This may have triggered people's interest. Another key factor could be seasonality. People may have had more time and interest in using the app with summer and holidays that started. Furthermore, these are the two only points that are so close to each other, having occurred only one month apart from each other. Calculating the growth rate over a longer period averages the noise, while measuring it for an interval of one month may give a wrong impression about the longer term trend. Since it is impossible to assess whether this quick rise is an ephemeral growth or a long term one, the latest data (June 2016) will be ignored. Growth from 2014 on is almost flat, an excellent sign for Snapchat because the carrying capacity can't be foreseen. This makes it very difficult to generate a clear scenario of its evolution, unlike what happened with Twitter. Indeed, Twitter's growth rate showed a clear decreasing line that showed very clear signs of what the carrying capacity would be. Snapchat's curve is so flat that a very small change in the slope of the line approximating the growth rate would mean a huge change in the carrying capacity prediction. As the Chief Investment Officer of ARK Invest states in her analysis "the S-curve fits 400 million or a billion users with similar levels of error"[46].

Two scenarios will be considered to predict Snapchat's evolution in DAU, a low and a high growth one. Both are obtained by approximating the second part of Snapchat's DAU, when the growth started to stabilize (at the beginning of 2014). In the first case, a regression is made on the normalized growth rate. In the second case, parameters for the logistic curve are obtained by fitting the

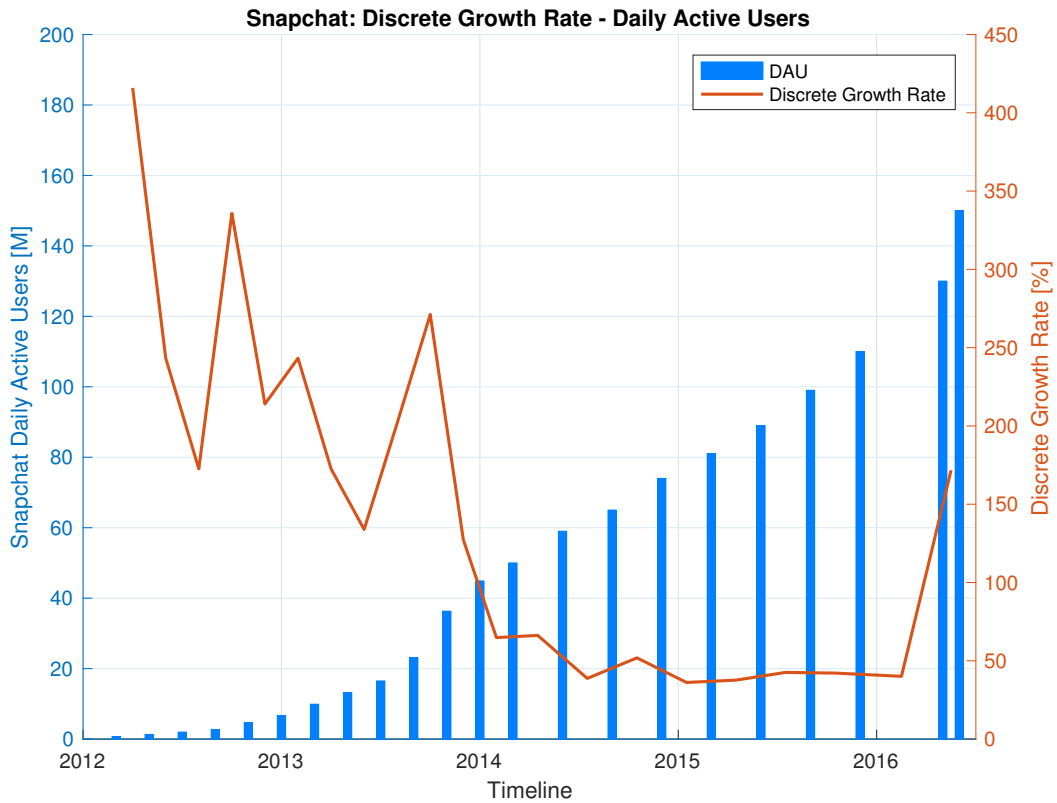


Figure 6.1: Snapchat's growth in 2014 saw a clear change in regime. It can be hypothesized that a second S-Curve started from then on, corresponding to the app evolution. The last enormous raise in growth rate will be ignored.

curve to the normalized data. In both cases, the growth of Internet users is taken into account. The low growth scenario predicts a carrying capacity of 400 million users, whereas the second scenario predicts a carrying capacity of 650 million users. Those two scenarios were chosen in order to cover a broad range of carrying capacities.

## 6.3 Revenue

Snapchat's valuation is challenging, firstly because the user base evolution is difficult to predict. However, predicting the revenue is perhaps even more challenging, since the data available is very limited. Snapchat's first ad appeared in October 2014. Then in January 2015, the "Discover" functionality was launched, allowing big media outlets to publish content [8]. Snapchat's strategy is to encourage publishers to add entertaining content for users and share the advertisement revenue with them. According to Recode, Snapchat wants to change the deal by paying publishers upfront in order to keep the whole share of ad revenues[30]. This shows Snapchat's optimistic position towards

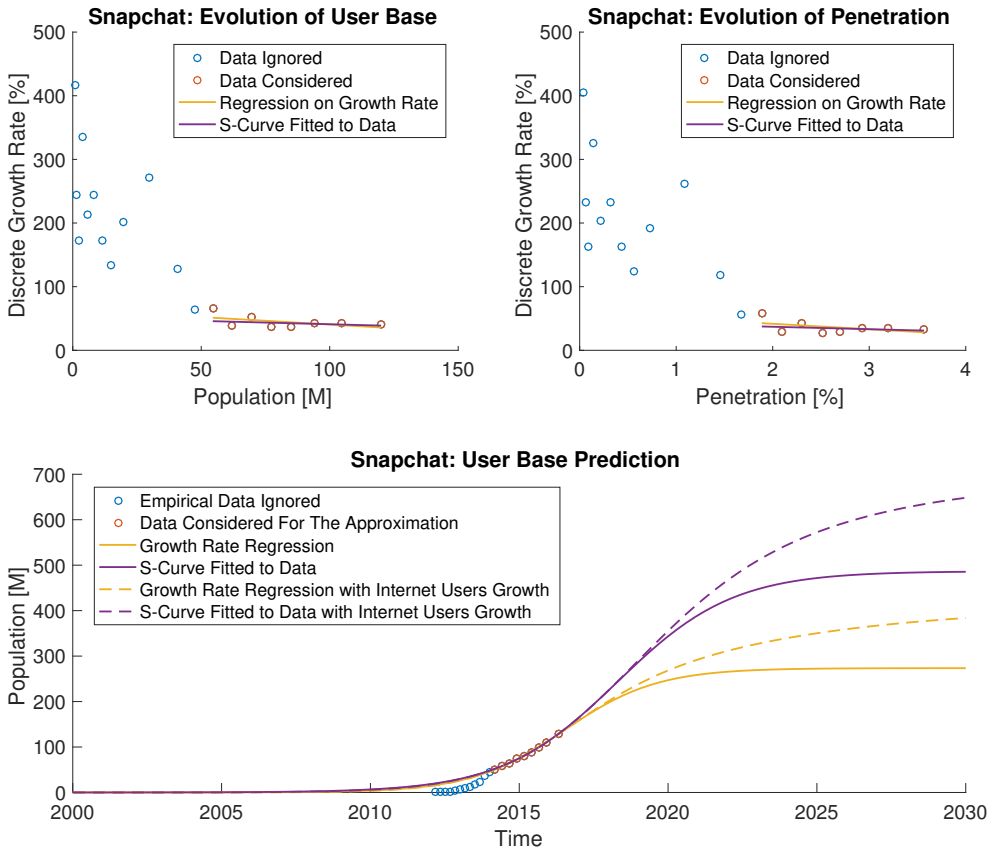


Figure 6.2: The two dashed lines will be taken as low growth and high growth scenarios.

the growth of their advertisement revenues.

While ads became more and more visible, Snapchat launched a crucial tool on June 2016, invisible for users: its own ads API (Application Programming Interface)[26]. Its objective is to facilitate the ad creation process. On one hand, ads partners will be responsible to "develop software enabling advertisers to buy ads on the network, as well as optimize and analyze campaigns" and on the other hand "creative partners, which will provide expertise in social content and know-how with Snapchat's 3V vertical video format" [6]. In other words, Snapchat has built a platform allowing any marketer to find partners with the know-how to realize ads that fit Snapchat. Finally, Lance Neuhauser, CEO of 4C, an API partner with current big social media players and now Snapchat, says he's never seen advertiser interest in an emerging social media platform grow as fast as it has for this app, not even Facebook. "We've been told that new buckets are actually being opened up for Snapchat specifically," he explains. "We've been told that there are new budgets raring to go."

[26]. Snapchat seems to have now all the tools and functionality to rapidly increase its advertisement revenues.

The key aspect to predict Snapchat's potential revenue is to compare it correctly with what already exists, for instance Twitter and Facebook. Snapchat raises interests from marketers because of its user retention characteristics:

- In terms of daily app usage, Snapchat averages 25 minutes[22]. In comparison, people average nine minutes across all of Yahoo's sites, two minutes on LinkedIn and just one minute on Twitter. Facebook is the leader with fifty minutes a day on average (although Instagram and Messenger are here included). Finally, Youtube retains people seventeen minutes per day. Time spent is an important measure of engagement because it shows directly how long each person uses the app (therefore how many ads a user can see a day), which is of utmost importance for marketers.
- Snapchat reaches 41% of consumers between eighteen and thirty-four years old in the US, in contrast with the top 15 TV channels that reach 6% of them[26].
- In a report from comScore [7], in term of "Average Monthly Hours Spent Among 18-34 Year-Olds on Social Networking Mobile Apps", Snapchat reaches 5.9 hours, more than Twitter's 3.5 hours, but far away from Facebook's impressive 25.7 hours.

Another study relates that Snapchat has an engagement rate four times superior to Instagram's and that a brand can have the same reach with 100'000 Snapchat followers as with 2 million on Instagram[32].

All these metrics have to be taken prudently. An employee recently sued Snap for being fired after refusing to fake growth numbers [14]. Snapchat has been campaigning to attract investors for their upcoming IPO and will certainly only show the metrics that are favorable. Nevertheless, with the exception of Facebook's targeting abilities, it is challenging to find arguments against Snapchat's potential in terms of advertising. Snapchat's ads are very original (people use and play with the ads) and it attracts the consumer's curiosity, while Facebook's ads are similar to those that can be found on typical websites (in the way they are shown). From what has been discussed here if Snapchat continues this way and doesn't get caught up by a simple trend effect, it has good chances to outperform the current big social media players. Snapchat's ARPU for 2016 should be around $2, which is certainly much lower than Twitter's and Facebook's $5 and $11.5 respectively, in 2015. But Snapchat's revenue history is only one and half years old, which is incomparable with FB's and Twitter's experience in this domain. Furthermore, with its new ads API, Snapchat seems to finally have the right tool to scale its revenue quickly by making third parties participate in the ads creation process. Last but definitely not least, the ARPU that will be calculated for Snapchat is actually

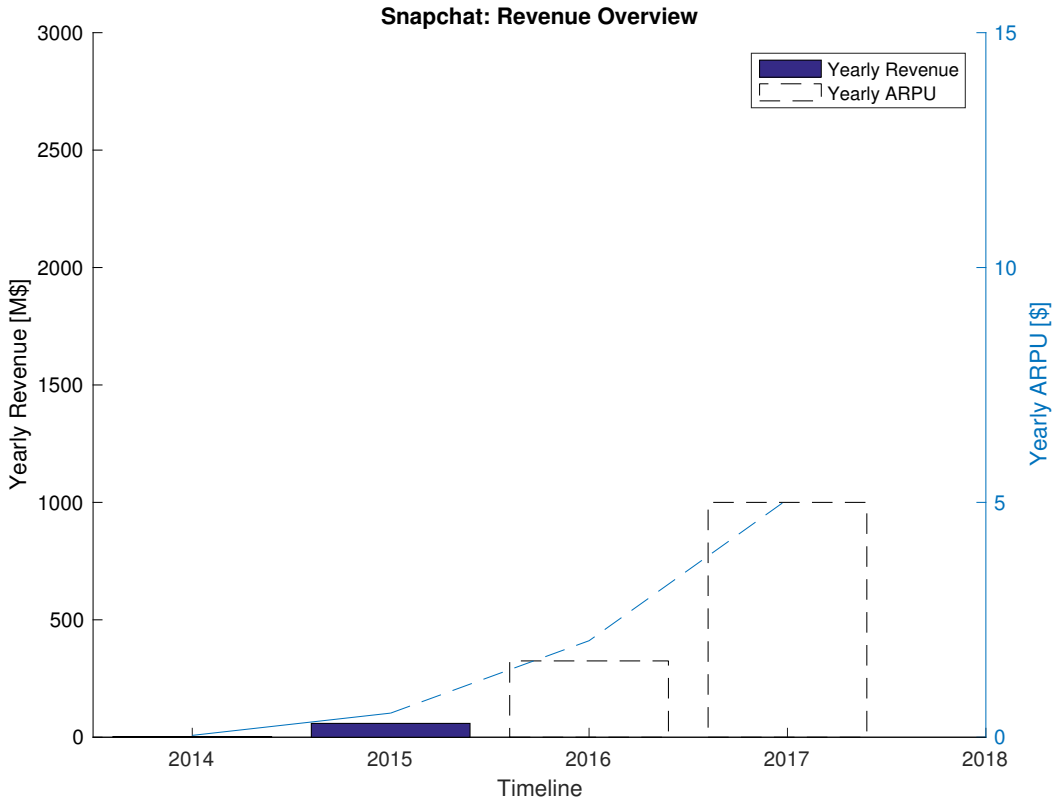


Figure 6.3: Snapchat's revenue for 2014 and 2015 and projections for 2016 and 2017

ARPDAU, which is revenue per daily active user. That means firstly that the current revenue per monthly user is inferior to the $2 stated previously. However, it also means that Twitter's ARPDAU in 2015 was $10 if we assume a DAU/MAU ratio of 50%. Facebook's ARPDAU in 2015 was more than $17. The sales of its glasses, termed spectacles, is neglected in the discussion. Snapchat started producing hardware with glasses equipped with a camera to facilitate video recording. This will most probably remain a marginal source of income. In other words, this won't change assumptions made on Snapchat's future profit margin.

### Costs

As mentioned in [4], Snapchat, like Facebook and Twitter, don't incur content costs, in contrast to Spotify's model. It is unclear how much social medias spend on server costs. The companies don't disclose the exact descriptions and it would require a deep accounting analysis to assess the exact percentage of revenue allocated to data servers. One thing can be said with certainty: Snapchat's costs in terms of servers will be definitely lower, meaning a bigger profit margin. This is due to

| Dates | Facebook ARPU: MAU—DAU [$] | Twitter ARPU MAU—DAU[$] |
|---|---|---|
| 2011 | 5.0 — 8.9 | 0.9 — 2 |
| 2012 | 5.3 — 9.1 | 1.7 — 3.8 |
| 2013 | 6.8 — 11.3 | 2.8 — 6.2 |
| 2014 | 9.5 — 15 | 4.9 — 10.9 |
| 2015 | 12.0 — 18.5 | 7.3 — 16.6 |

Table 6.1: Facebook's and Twitter's annual average revenue per monthly - daily user.

Snapchat's ephemeral dimension. No picture can be retrieved and quickly accessible. This is a major advantage compared to FB, Instagram or Twitter, where pictures and posts should always be rapidly accessible. A journalist from Wired tried to assess this cost difference and deducted that it should be "under 9 percent of Facebook's total estimated infrastructure costs" [41].

This means that Snapchat doesn't have any barriers in achieving the same profit margins as Facebook. Snapchat sees a constant growth in users, coupled by potentially lower exploitation costs and promising future revenue.

## 6.4 Valuation

The goal here isn't to perform an in-depth accounting analysis, rather to discuss qualitatively what the profit margin may look like. And from what has been discussed beforehand, the following assumptions can be made:

1. User growth will be simulated by two scenarios
2. Snapchat's server costs will most probably be less substantial compared to its competitors'
3. ARPU will grow significantly because of Snapchat's retention power and due to its different means of advertising. Larger ARPU would mean larger revenue and therefore, greater profit margin (for constant costs)

Furthermore, for the simulation of future cashflows, the following assumptions are made:

1. No profit will be made in 2017, which presumably decreases the Snapchat's valuation due to the good predictions that can be made for 2017
2. From 2018 forward, Snapchat will have constant profit margin and ARPU

The discounted cash flow can therefore be calculated and the net present value obtained. The future number of users is multiplied by two variables: ARPU and profit. The third variable is the discount rate used then to calculate the final value. Figure 6.4 represents the two isosurfaces (for

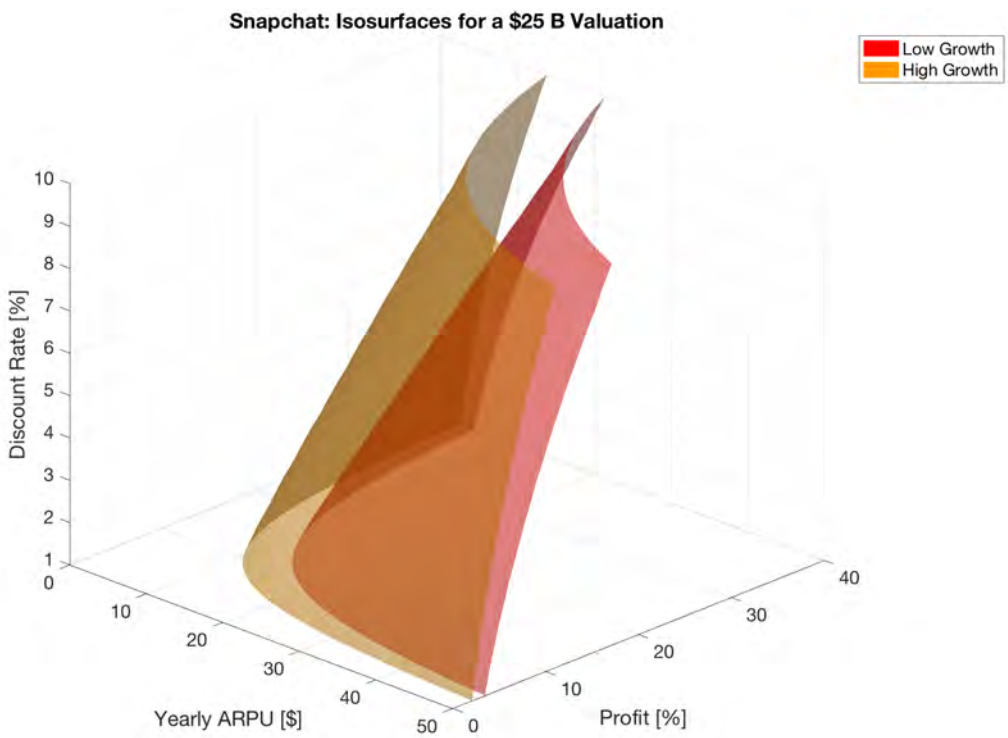


Figure 6.4: Two isosurfaces (one for each growth scenario) are shown here . They show the combination of parameters leading to a theoretical valuation of $25B. Assuming a discount rate of 5%, for a valuation of $25B, we obtain: 14% of profit margin for a yearly ARPU of $30 to 25% of profit margin for a yearly ARPU of $16. Considering Facebook's current profit margin of roughly 25% since 2014 (even reaching 48% in December 2016 [59]), those are conceivable objectives. Furthermore, Facebook's ARPDAU in 2015 reached $18.5 while Twitter's was $16.6 (see Table 6.1), which shows that the ARPU objectives for Snapchat are feasible.

the low and high growth), covering all the combinations of profit margin, ARPU and discount rate to achieve a $25B valuation (see appendix for a more limited range discount rates representation). Figure 6.5 shows the isolines of different valuations for a discount rate of 5%.

In the low growth case, to achieve the supposed valuation, an ARPU of $20 combined with a profit margin of 20% should be achieved in the long term, starting from 2018. In the high growth case, an ARPU of $17 for a 15% of profit margin must be achieved. This shows that the valuation is arguably high because Snapchat is far from reaching these numbers, as it is only at the beginning of its monetization phase. However, considering the conclusions and discussion made previously, this valuation certainly isn't exaggerated, as Snapchat can arguably reach such ARPU and profit margin.

Profit margins calculated are within reason. This is in contrast to Twitter, who struggles to make

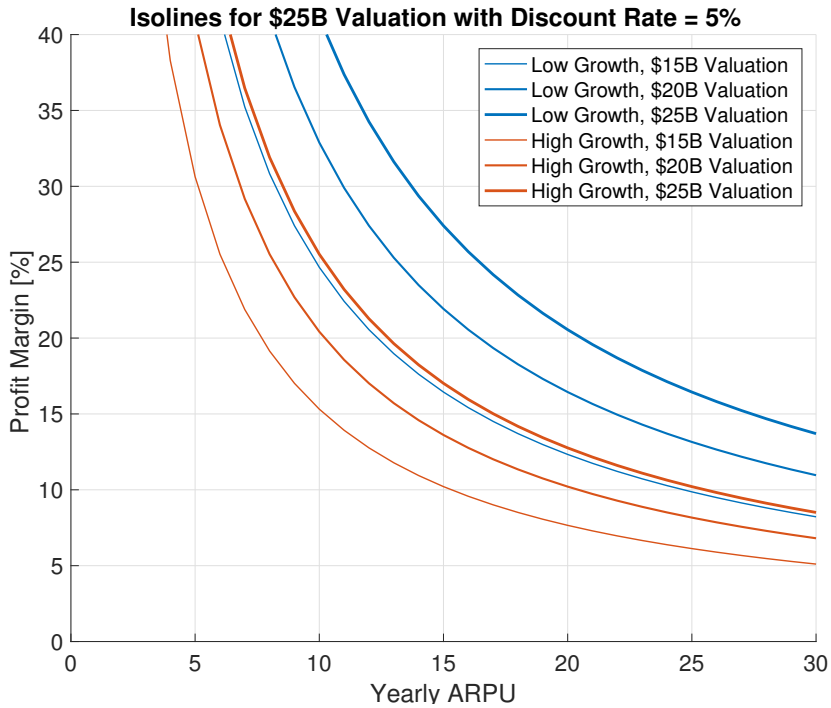


Figure 6.5: Isolines for Snapchat's different valuations with a discount rate of 5%. As illustrated with Figure 6.4, the expectations Snapchat need to meet in order to justify its current valuation are achievable. It is here shown that for a valuation of $25B, Snapchat's profit margin should be, roughly, between 10% and 25% with a yearly ARPU between $15 and $25. Those rather conceivable objectives may highlight the current doubts of investors compared to Facebook's valuation in 2011.

profit. However, as discussed previously, Snapchat most likely will not be in this case, given all its advantages in the advertisement field. Furthermore, Snapchat's aimed ARPU, compared to Facebook's and Twitter's current ARPDAU, are also achievable. This is mainly owed to Snapchat's attraction. Snapchat's users are more valuable than Twitter's for instance, because they spend more time on the app. Futhermore, the current exponential growth of overall ARPU (see section 4.2) will most probably benefit Snapchat. An actor such as Snapchat with its originality will most definitely interest marketers and follow this upward going trend.

# Chapter 7

# Conclusion

Number of companies were built around the Internet, with entirely novel business models. When these companies started getting public, the problem of their value became clear: how could the market value them, given that the used methods were not adapted to their model, that they operate in quickly evolving environments and that their developments are difficult to foresee? The current financial context analysis highlighted frequent overvaluations. It also showed, on the other hand, that markets correct valuations quickly, if the companies show signs of unfavorable user growth rates. It is also noticed that the markets behave more cautiously than what they used to in the early days of the "start-up bubble", as investors recognize that promising companies such as Twitter, Renren or Groupon struggled to turn into profitable businesses.

Twitter's and Facebook's growth have then been examined, to assess examples of patterns that now grown up unicorns can have followed. The importance of accounting for the growth of Internet users has been shown. If this factor improves the fitting of Facebook's modeled growth, it does not explain the difference between the two companies. The technological improvement has been discussed as a potential major driver of growth. This hypothesis is supported by the analysis of Facebook, having managed to continuously adapt its product to reach new market segments, while Twitter struggled to do so. This has resulted in Facebook's population growing almost linearly for now four years, while Twitter's carrying capacity, that had been predicted three years ago, has been reached in 2016 instead of increasing. Despite showing two very different growth paths, the two companies' Average Revenue Per User (ARPU) have developed in a similar fashion. This phenomenon highlights the current trend for social media and more generally online advertisement. This effect has been perfectly illustrated by the switch of interest from newspapers to the Internet [15]. Internet advertisement revenue has been negatively correlated to newspapers'. This trend doesn't appear to have reached its peak yet. Facebook's and Twitter's ARPU should continue to grow in the next years, considering the evolution to this day.

The analysis of Spotify highlighted the company's difficulties to reach profitability. The future cash flows have been predicted based on three growth scenarios of premium users. The analysis suggested that Spotify would be forced either to create other revenue streams than the current ones (subscriptions and advertisements), or to increase its revenue from advertisements. In the current situation, the costs of royalties are so high that even a minimal profit margin is currently hardly conceivable. This profit margin should be between 2% and 3% in order to achieve the company's current valuation of $8 billion. The plausibility of reaching this level is indicated by Netflix, which operates a very similar business model and exhibits profit margins ranging between 1% and 5%. Nevertheless, Spotify faces very important barriers on its way to profitability. Spotify's model disrupts the long-established music consumption patterns and royalty fees are a major burden. A better advertisement monetization is highly needed to overcome those costs. If this is achieved rapidly, Spotify's valuation will be justified and can be further raised.

Snapchat's valuation is challenging to assess for different reasons than Spotify's. Its future user growth is very uncertain because of the high uncertainty concerning its carrying capacity. Two scenarios were considered to capture the evolution of daily active users, one based on the normalized growth rate, and the other by fitting the curve to the normalized data. Furthermore, the prediction of Snapchat's future ARPU is to be estimated based on little historc data, since the company has been monetizing its services for only two years now. For these reasons, the growth evolution has been assumed based on an analogy with its competitors. The valuation has been assessed by assuming that no profit will be made in 2017, and that revenue and profit margin would be constant in the following years. The valuation was then discussed based on isosurfaces, combining the different profit margins, ARPU and discount rates in order to achieve a valuation of $25 billion which is its current rumored valuation. To justify its current rumored valuation, it was shown that with such assumptions and a discount rate of 5%, yearly ARPU of $15 to $25 should be achieved, combined with a profit margin between 15% and 20%. Considering that the average revenue per daily user of Facebook and Twitter are raising and are currently over 20$, the valuation seems close to an appropriate estimation rather than an overvaluation. Nevertheless, the assumptions made to assess Snapchat's valuations were optimistic and there is a non negligible chance that Snapchat doesn't manage to have user growths such as the ones predicted.

# Appendix A

# Facebook

| Dates | Facebook MAU [M] |
|---|---|
| Dec-04 | 1 |
| Dec-05 | 5.5 |
| Dec-06 | 12 |
| Apr-07 | 20 |
| Oct-07 | 50 |
| Sep-08 | 100 |
| Mar-09 | 197 |
| Jun-09 | 242 |
| Sep-09 | 305 |
| Dec-09 | 360 |
| Mar-10 | 431 |
| Jun-10 | 482 |
| Sep-10 | 550 |
| Dec-10 | 608 |
| Mar-11 | 680 |
| Jun-11 | 739 |
| Sep-11 | 800 |
| Dec-11 | 845 |
| Mar-12 | 901 |
| Jun-12 | 955 |
| Sep-12 | 1'007 |
| Dec-12 | 1'056 |
| Mar-13 | 1'110 |
| Jun-13 | 1'155 |
| Sep-13 | 1'189 |
| Dec-13 | 1'228 |
| Mar-14 | 1'276 |
| Jun-14 | 1'317 |
| Sep-14 | 1'350 |
| Dec-14 | 1'393 |
| Mar-15 | 1'441 |
| Jun-15 | 1'490 |
| Sep-15 | 1'545 |
| Dec-15 | 1'591 |
| Mar-16 | 1'654 |
| Jun-16 | 1'712 |
| Sep-16 | 1'788 |

Table A.1: Facebook MAU. Source: [43] and Facebook

| Dates | FB Quarterly Revenue [$M] |
|---|---|
| Mar-10 | 345 |
| Jun-10 | 432 |
| Sep-10 | 467 |
| Dec-10 | 731 |
| Mar-11 | 731 |
| Jun-11 | 895 |
| Sep-11 | 954 |
| Dec-11 | 1'131 |
| Mar-12 | 1'058 |
| Jun-12 | 1'184 |
| Sep-12 | 1'262 |
| Dec-12 | 1'585 |
| Mar-13 | 1'458 |
| Jun-13 | 1'813 |
| Sep-13 | 2'016 |
| Dec-13 | 2'585 |
| Mar-14 | 2'502 |
| Jun-14 | 2'910 |
| Sep-14 | 3'203 |
| Dec-14 | 3'851 |
| Mar-15 | 3'543 |
| Jun-15 | 4'042 |
| Sep-15 | 4'501 |
| Dec-15 | 5'841 |
| Mar-16 | 5'382 |
| Jun-16 | 6'436 |
| Sep-16 | 7'011 |

Table A.2: Facebook Quarterly Revenue. Source: Facebook Income Statement

# Appendix B

# Twitter

| Dates | Twitter Monthly Users |
|---|---|
| Mar-10 | 30 |
| Jun-10 | 40 |
| Sep-10 | 49 |
| Dec-10 | 54 |
| Mar-11 | 68 |
| Jun-11 | 85 |
| Sep-11 | 101 |
| Dec-11 | 117 |
| Mar-12 | 138 |
| Jun-12 | 151 |
| Sep-12 | 167 |
| Dec-12 | 185 |
| Mar-13 | 204 |
| Jun-13 | 218 |
| Sep-13 | 232 |
| Dec-13 | 241 |
| Mar-14 | 255 |
| Jun-14 | 271 |
| Sep-14 | 284 |
| Dec-14 | 288 |
| Mar-15 | 302 |
| Jun-15 | 304 |
| Sep-15 | 307 |
| Dec-15 | 305 |
| Mar-16 | 310 |
| Jun-16 | 313 |

Table B.1: Twitter MAU. Source: Twitter

| Dates | Twitter Quarterly Revenue [$M] |
|---|---|
| Mar-11 | 17.91 |
| Jun-11 | 20.77 |
| Sep-11 | 26.42 |
| Dec-11 | 41.21 |
| Mar-12 | 54.31 |
| Jun-12 | 68.05 |
| Sep-12 | 82.33 |
| Dec-12 | 112.25 |
| Mar-13 | 114.34 |
| Jun-13 | 139.29 |
| Sep-13 | 168.58 |
| Dec-13 | 242.68 |
| Mar-14 | 250.49 |
| Jun-14 | 312.17 |
| Sep-14 | 361.27 |
| Dec-14 | 479.08 |
| Mar-15 | 435.94 |
| Jun-15 | 502.38 |
| Sep-15 | 569.24 |
| Dec-15 | 710.47 |
| Mar-16 | 594.52 |
| Jun-16 | 601.96 |
| Sep-16 | 615.93 |

Table B.2: Twitter Quarterly Revenue. Source: Twitter Income Statement

# Appendix C

# Spotify

| Year | Premium Users [ M] |
|---|---|
| July 2010 | 0.5 |
| March 2011 | 1 |
| June 2011 | 1.5 |
| November 2011 | 2.5 |
| January 2012 | 3 |
| August 2012 | 4 |
| December 2012 | 5 |
| March 2013 | 6 |
| May 2014 | 10 |
| November 2014 | 12.5 |
| January 2015 | 15 |
| June 2015 | 20 |
| March 2016 | 30 |
| August 2016 | 39 |
| September 2016 | 40 |

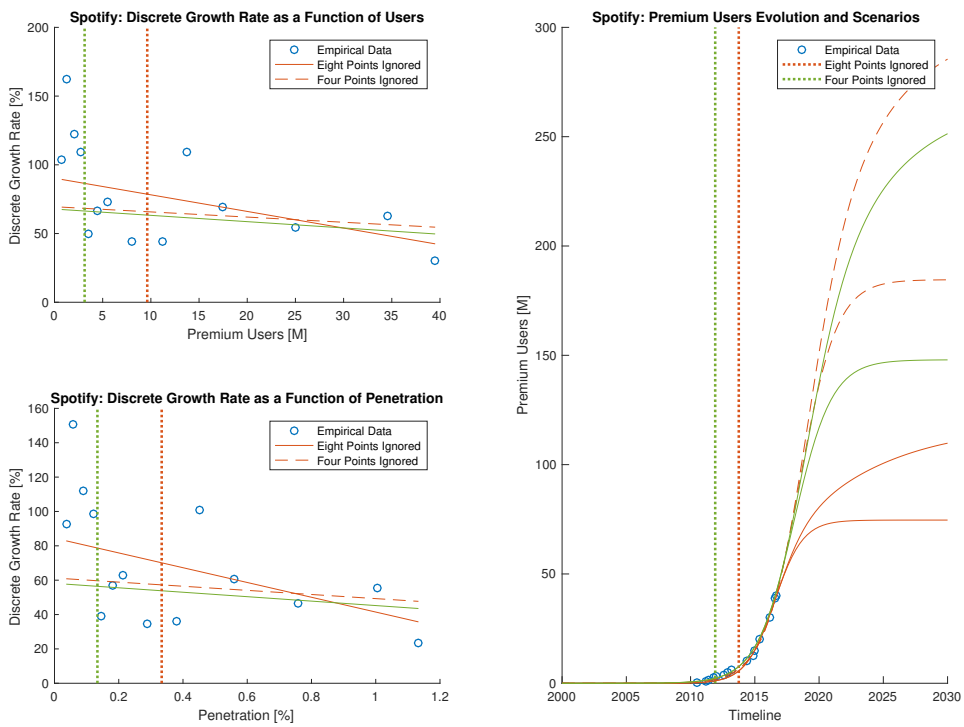


Figure C.1: Illustration of all the different scenarios for Spotify's interpolation. The curves in red correspond to the scenario where eight first points are ignored, while the ones in green correspond to the scenario where four first points are ignored. Plain lines represent linear regression made on discrete growth rate while dashed lines represent logistic function fitting to the users as a function of time data

## Scenario overview

| | Base | Best |
|---|---|---|
| **IMPLIED MARKET CAP** | **$20 Bn** | **$53 Bn** |
| Paying users (M) | 100 | 100 |
| Revenue per paying user ($/year) | 89 | 89 |
| Paying user revenue ($ M) | 8,864 | 8,864 |
| Revenue non-paying user ($/year) | 10 | 14 |
| Non-paying users (M) | 200 | 200 |
| Ad revenues ($ M) | 2,000 | 2,800 |
| Ad revenue % | 18.4% | 24.0% |
| **TOTAL REVENUES** | **10,864** | **11,664** |
| COGS paying users | -6,825 | -6,763 |
| COGS ad revenueus | -1,000 | -1,400 |
| **TOTAL COGS** | **-7,825** | **-8,163** |
| *Gross margin* | *28%* | *30%* |
| **EBIT** | **866** | **1,984** |
| *EBIT %* | *8.0%* | *17.0%* |
| **EBITDA** | **975** | **2,101** |
| *EBITDA %* | *9.0%* | *18.0%* |
| | | |
| EV/EBITDA multiple | 20x | 25x |
| Enterprise Value | 19,491 | 52,528 |
| Net debt | -200 | -200 |
| Market cap | 19,691 | 52,728 |
| NOSO FD (M) | 4.2 | 4.2 |
| Share price | 4,636 | 12,415 |
| Return from $1800 | 2.6x | 6.9x |
| | | |
| Implied EV/Revenue | 1.8x | 4.5x |
| Implied EV/Gross profit multiple | 6.4x | 15.0x |
| Implied EV/EBIT multiple | 22.5x | 26.5x |

*Source: annual reports, CapitalIQ, GP Bullhound analysis*

Figure C.2

| Netflix's Income Statement | | | | |
|---|---|---|---|---|
| Year | 2014 | | 2015 | |
| | | % Of Revenue | | % Of Revenue |
| Revenue | $5'504'656 | | $6'779'511 | |
| Cost of revenues | 3'752'760 | 68.20% | 4'591'476 | 67.70% |
| Marketing | 607'186 | 11.00% | 824'092 | 12.20% |
| Technology and development | 472'321 | 8.60% | 650'788 | 9.60% |
| General and administrative | 269'741 | 4.90% | 407'329 | 6.00% |

Table C.1: Netflix's Income Statement [20]

# Appendix D

# Snapchat

| Dates | Snap DAU [mio] |
|---|---|
| Mar-12 | 0.66* |
| May-12 | 1.32* |
| Jul-12 | 1.98* |
| Sep-12 | 2.64* |
| Nov-12 | 4.62* |
| Jan-13 | 6.6* |
| Mar-13 | 9.9* |
| May-13 | 13.2* |
| Jul-13 | 16.5* |
| Sep-13 | 23.1* |
| Nov-13 | 36.3* |
| Jan-14 | 44.88* |
| Mar-14 | 50 |
| Jun-14 | 59 |
| Sep-14 | 65 |
| Dec-14 | 74 |
| Mar-15 | 81 |
| Jun-15 | 89 |
| Sep-15 | 99 |
| Dec-15 | 110 |
| May-16 | 130 |
| Jun-16 | 150 |

Table D.1: * are approximation made from MAU data, collected by Business Insider Intelligence. The rest is data provided by Statista.

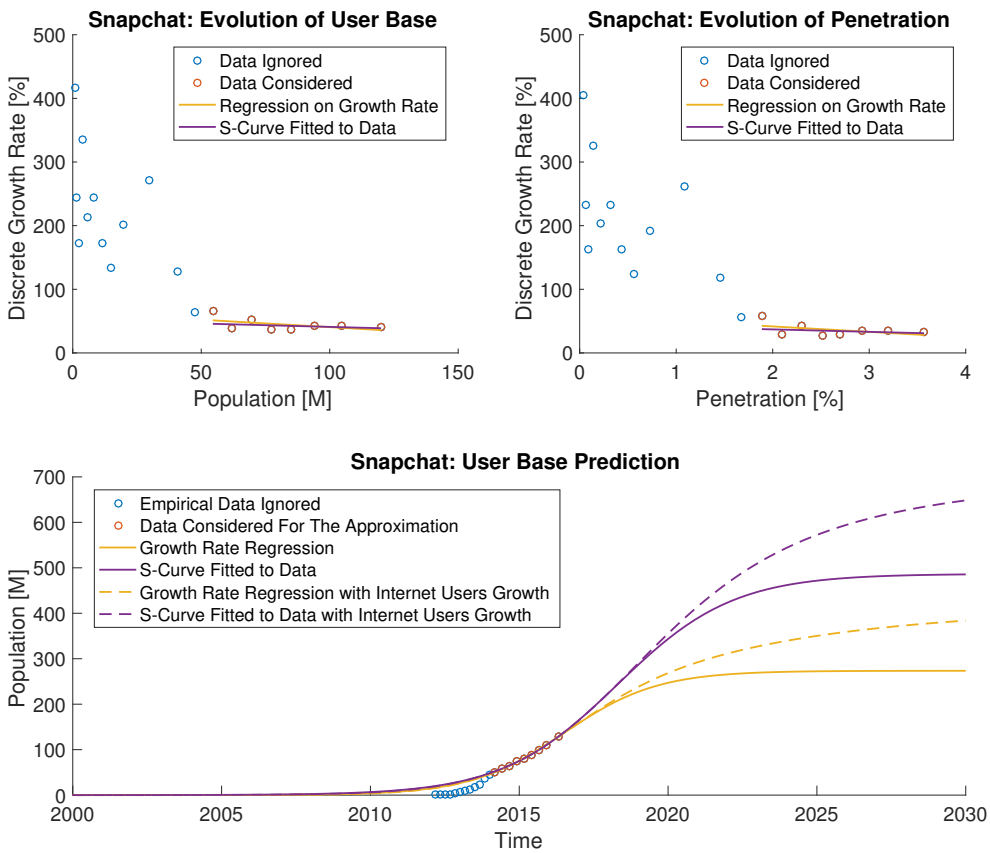
Snapchat: Evolution of User Base
Discrete Growth Rate [%]
Population [M]
Data Ignored
Data Considered
Regression on Growth Rate
S-Curve Fitted to Data
Snapchat: Evolution of Penetration
Discrete Growth Rate [%]
Penetration [%]
Data Ignored
Data Considered
Regression on Growth Rate
S-Curve Fitted to Data
Snapchat: User Base Prediction
Population [M]
Time
Empirical Data Ignored
Data Considered For The Approximation
Growth Rate Regression
S-Curve Fitted to Data
Growth Rate Regression with Internet Users Growth
S-Curve Fitted to Data with Internet Users Growth

Figure D.1

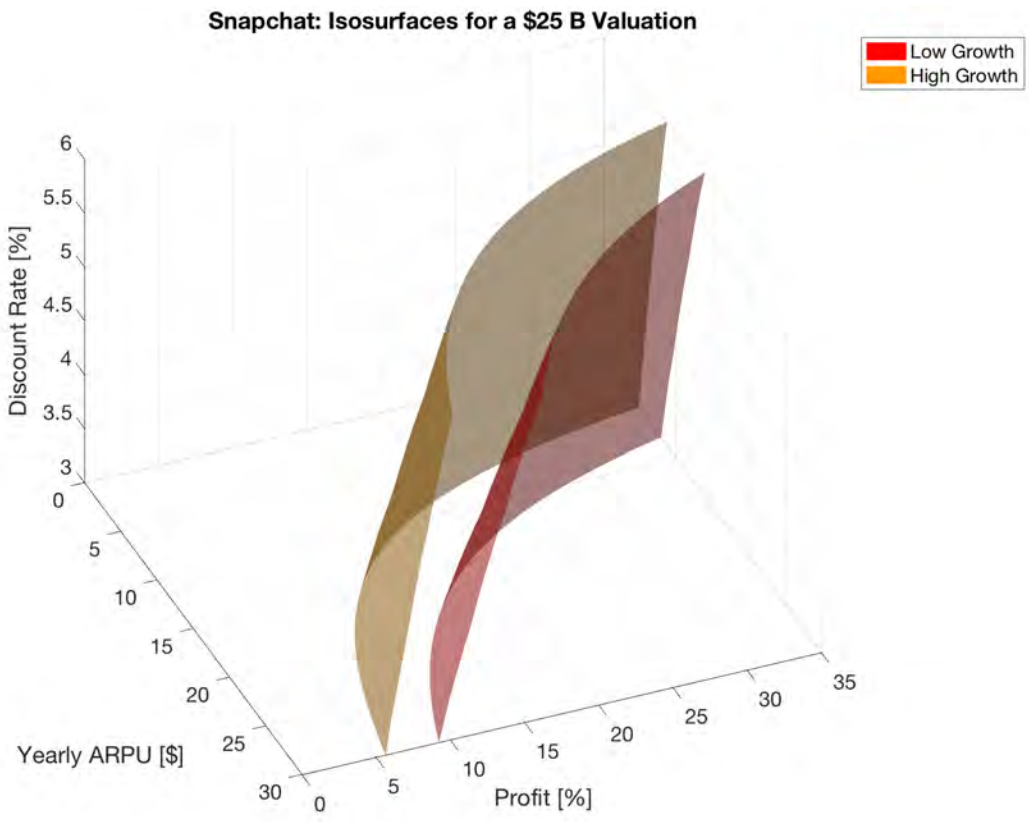


Figure D.2: Two isosurfaces (one for each growth scenario) are here shown. They show the combination of parameters leading to a theoretical valuation of $ 25 B.

# Bibliography


[1] Leila Abboud. Spotify's shaven-headed savior, January 2017. URL https://www.bloomberg.com/gadfly/articles/2017-01-03/is-daniel-ek-of-spotify-ready-to-save-the-music-business/.

[2] Ann-Kristin Achleitner, Hansjörg Zelger, Sven Beyer, and Kay Müller. Venture capital/private equity-studie 2004: Company-(e) valuation und evca valuation guidelines. *Finanz Betrieb*, 10: 701–709, 2004.

[3] Fred D Arditti and Haim Levy. The weighted average cost of capital as a cutoff rate: a critical analysis of the classical textbook weighted average. *Financial management*, pages 24–34, 1977.

[4] Henry Blodget. How snapchat plans to make money, November 2013. URL http://www.businessinsider.fr/us/how-snapchat-will-make-money-2013-11/.

[5] Donald R Chambers, Robert S Harris, and John J Pringle. Treatment of financing mix in analyzing investment opportunities. *Financial Management*, pages 24–41, 1982.

[6] David Cohen. Snapchat launches ads api, names ads partners, creative partners, June 2016. URL http://www.adweek.com/socialtimes/snapchat-ads-api-ads-partners-creative-partners/640836/.

[7] comScore. The 2015 u.s. mobile app report, January 2016. URL https://www.comscore.com/layout/set/popup/content/download/31497/1802935/version/2/file/2015-US-Mobile-App-Report.pdf/.

[8] Jordan Crook. Snapchat launches discover, January 2015. URL https://techcrunch.com/2015/01/27/snapchat-launches-discover/.

[9] Jan Dawson. Why is facebook doing so well?, April 2016. URL http://www.recode.net/2016/4/29/11586544/why-is-facebook-doing-so-well.

[10] Jan Dawson. Facebook, ad load, and revenue growth, November 2016. URL http://www.beyonddevic.es/2016/11/08/facebook-ad-load-and-revenue-growth/.

[11] Jan Dawson. Twitter's terrible new metric, October 2016. URL http://www.beyonddevic.es/2016/10/27/twitters-terrible-new-metric/.

[12] Jan Dawson. Twitter q2 2016 earnings commentary, July 2016. URL http://www.beyonddevic.es/2016/07/26/twitter-q2-2016-earnings-commentary/.

[13] Romain Dillet. Snapchat adds ephemeral text chat and video calls, May 2014. URL https://techcrunch.com/2014/05/01/snapchat-adds-text-chat-and-video-calls/.

[14] Tyler Durden. Did snapchat fake growth numbers to boost its ipo value? this ex-employee seems to think so, January 2017. URL http://www.zerohedge.com/news/2017-01-05/did-snapchat-fake-growth-numbers-ex-employee-seem-think-so/.

[15] The Economist. News adventures, December 2012. URL http://www.economist.com/news/business/21567934-after-years-bad-headlines-industry-finally-has-some-good-news-news-adventu

[16] eMarketer. Facebook remains the largest social network in most major markets, April 2016. URL https://www.emarketer.com/Article/Facebook-Remains-Largest-Social-Network-Most-Major-Markets/1013798.

[17] Dirk Engel and Max Keilbach. Firm-level implications of early stage venture capital investmentan empirical investigation. *Journal of Empirical Finance*, 14(2):150–167, 2007.

[18] Pablo Fernandez. Company valuation methods. *The most common errors in valuation*, 2007.

[19] Pablo Fernandez, Javier Aguirreamalloa, and Luis Corres Avendaño. Us market risk premium used in 2011 by professors, analysts and companies: a survey with 5.731 answers. 2011.

[20] Netflix Financials. Netflix income statement. URL https://ir.netflix.com/financials.cfm?CategoryID=282.

[21] Kerry Flynn. Facebook (fb) instagram revenue to reach 3.2b in 2016, credit suisse estimates, April 2016. URL http://www.ibtimes.com/facebook-fb-instagram-revenue-reach-32b-2016-credit-suisse-estimates-2356016/.

[22] Sarah Frier. Snapchat's spiegel to investors: We have 8 billion video views a day, March 2016. URL https://www.bloomberg.com/news/articles/2016-02-29/snapchat-s-spiegel-to-investors-we-have-8-billion-video-views-a-day.

[23] Tom Funk. *Web 2.0 and beyond: Understanding the new online business models, trends, and technologies*. Praeger Publishers, 2008.

[24] G Thomas Goodnight and Sandy Green. Rhetoric, risk, and markets: The dot-com bubble. *Quarterly Journal of Speech*, 96(2):115–140, 2010.

[25] Uwe Götze, Deryl Northcott, and Peter Schuster. Discounted cash flow methods. In *Investment Appraisal*, pages 47–83. Springer, 2015.

[26] Christopher Heine. Snapchat launches a colossal expansion of its advertising, ushering in a new era for the app unveils new api and 1 billion dollars goal, June 2016. URL `http://www.adweek.com/digital/snapchat-launches-colossal-expansion-its-advertising-ushering-new-era-app-171924/`.

[27] Tim Ingham. How can spotify become profitable?, May 2015. URL `http://www.musicbusinessworldwide.com/how-can-spotify-become-profitable/`.

[28] Investopedia. Price-to-sales ratio - psr. URL `http://www.investopedia.com/terms/p/price-to-salesratio.asp/`.

[29] Michael Johnston. How does linkedin make money?, December 2013. URL `https://monetizepros.com/monetization-basics/how-does-linkedin-make-money/`.

[30] Peter Kafka. Snapchat wants to stop sharing ad revenue with its media partners, October 2016. URL `http://www.recode.net/2016/10/18/13326196/snapchat-discover-ad-sales-plan-change/`.

[31] Aileen Lee. Welcome to the unicorn club: Learning from billion-dollar startups, December 2015. URL `https://techcrunch.com/2013/11/02/welcome-to-the-unicorn-club/`.

[32] Jonathan Liedman. 1 snapchat follower = 20 instagram followers?, May 2016. URL `http://www.wickedsociety.se/1-snapchat-follower-20-instagram-followers/`.

[33] Ingrid Lunden and Katie Roof. Snapchat raised 1.8b in a series f round; leaked deck reveals revenues, user numbers, May 2016. URL `https://techcrunch.com/2016/05/26/snapchat-series-f/`.

[34] Douglas MacMillan. Spotify raises 1 billion in debt financing, March 2016. URL `http://www.wsj.com/articles/spotify-raises-1-billion-in-debt-financing-1459284467/`.

[35] Lee Marshall. 'let's keep music special. fspotify': on-demand streaming and the controversy over artist royalties. *Creative Industries Journal*, 8(2):177–189, 2015. doi: 10.1080/17510694.2015.1096618. URL `http://dx.doi.org/10.1080/17510694.2015.1096618`.

[36] Nigel Meade. The use of growth curves in forecasting market development-a review and appraisal*. *Journal of Forecasting*, 3:429–451, October 1984.

[37] Stewart C Myers. Interactions of corporate financing and investment decisionsimplications for capital budgeting. *The Journal of finance*, 29(1):1–25, 1974.

[38] Nasdaq. Fb company financials, . URL http://www.nasdaq.com/symbol/fb/financials?query=income-statement/.

[39] Nasdaq. Twtr company financials, . URL http://www.nasdaq.com/symbol/twtr/financials?query=income-statement/.

[40] Nicolas Richaud Nicolas Rauline. Uber, snap, spotify, wework, dropbox: les entres en bourse les plus attendues en 2017, January 2017. URL https://www.lesechos.fr/tech-medias/hightech/0211666516170-snap-spotify-dropbox-les-5-entrees-en-bourse-tech-les-plus-attendues-en-2017-php.

[41] Vijay Pandurangan. The key to snapchats profitability: Its dirt cheap to run, January 2014. URL https://www.wired.com/2014/01/secret-snapchats-monetization-success-will-surprise/.

[42] Robert Ahldin Per Roman and Joakim Dal. Spotify growth is accelerating, September 2016. URL http://tech.eu/wp-content/uploads/2016/09/GP-Bullhound-Spotify-Update-Sept-2016.pdf.

[43] Didier Sornette Peter Cauwels. Quis pendit ipsa pretia: facebook valuation and diagnostic of a bubble based on nonlinear demographic dynamics. *Journal of Portfolio Management*, 38(2): 56–66, 2012.

[44] Steven Richmond. How snapchat makes money (fb, twtr), November 2016. URL http://www.investopedia.com/articles/investing/061915/how-snapchat-makes-money.asp/.

[45] Evelyn M. Rusli and Douglas MacMillan. Snapchat spurned 3 billion acquisition offer from facebook, November 2013. URL http://blogs.wsj.com/digits/2013/11/13/snapchat-spurned-3-billion-acquisition-offer-from-facebook/.

[46] Evelyn M. Rusli and Douglas MacMillan. The future of social and messaging apps predictions for 2020, November 2013. URL https://www.hvst.com/posts/68141-the-future-of-social-and-messaging-apps-predictions-for-2020/.

[47] Steven Russolillo. Morning moneybeat: Bubble warnings pile up, March 2014. URL http://blogs.wsj.com/moneybeat/2014/03/05/morning-moneybeat-bubble-warnings-pile-up/.

[48] Steven Russolillo. No profits, no problem? think again, April 2014. URL http://blogs.wsj.com/moneybeat/2014/04/17/no-profits-no-problem-think-again/.

[49] Steven Russolillo. David einhorn: we are witnessing our second tech bubble in 15 years, April 2014. URL http://blogs.wsj.com/moneybeat/2014/04/22/david-einhorn-we-are-witnessing-our-second-tech-bubble-in-15-years/.

[50] Spotify. Hello america. spotify here., July 2011. URL https://news.spotify.com/us/2011/07/14/hello-america-spotify-here/.

[51] Statista, 2017. URL https://www.statista.com/statistics/187041/us-user-age-distribution-on-facebook/.

[52] Internet World Stats. Top 50 countries with the highest internet penetration rates - 2013, January 2014. URL http://www.internetworldstats.com/top25.htm.

[53] Seth Stevenson. Snapchat releases first hardware product, spectacles, September 2016. URL http://www.wsj.com/articles/snapchat-releases-first-hardware-product-spectacles-1474682719/.

[54] The Spotify Team. We've only just begun!, October 2008. URL https://news.spotify.com/us/2008/10/07/weve-only-just-begun/.

[55] TechCrunch. Unicorn leaderboard, January 2017. URL https://techcrunch.com/unicorn-leaderboard/.

[56] Mahesh Vellanki. This is why public and private market valuations are completely different, September 2015. URL http://www.mahesh-vc.com/blog/this-is-why-public-and-private-market-valuations-are-completely-different/.

[57] John B Vinturella and Suzanne M Erickson. *Raising entrepreneurial capital*. Academic Press, 2003.

[58] Dr. Edward Yardeni. Stock market briefing:sp 500/400/600 weekly forward earnings and valuation, January 2017. URL https://www.yardeni.com/Pub/peacockfeval.pdf.

[59] Zacks. Facebook profit margin, January 2017.

[60] Mark Zuckerberg, March 2014. URL https://www.facebook.com/zuck/posts/10101319050523971/.