LUISS

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Chair of Financial Statement Analysis

How private market valuations have caused the "Unicorn Bubble"

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Summary

Introduction

During the last 10 years, the global market has seen the rise of Unicorns, privately held companies with a valuation of over $1 billion. The availability of huge amounts of money on the private market has caused a long series of VC[1]-backed financing rounds that have inflated the valuation of these start-ups. Most of them are unprofitable companies with ideas or products that are disrupting existing markets or creating new ones. The hype around them is growing and everyone wants to be part of the innovation. Venture capitals try to find the "next big company" and let companies focus on building market share rather than outlining a path to profit. But, once these start-ups start thinking about IPOs, they face market expectations. These are based more on a good business model, proper corporate governance and a clear path to profitability. Even if these companies are evaluated billions of dollars, they are not able to translate in the public market what they have achieved in the private. Thus, many Unicorn's IPOs are big failures, as the stock price falls immediately after the listing. Some analysts believe that the speculative bubble that has been created around Unicorns is going to burst soon, while others think that this will be the new normality.

The purpose of the thesis is to analyze the huge valuations given them primarily by Venture Capitalists to see if these companies are fairly evaluated.

After going through a description of Unicorns and who they are, the report will focus on the process of financing and what's in it for private investors. Given the accessibility of huge amounts of capital, there will be raised the question of whether Unicorns should stay private or going public. The big difference between private and public market seems to impact on companies' valuations. The second chapter is dedicated to the three most commonly used models to evaluate a company: Multiple analysis, Discounted Free Cash Flow and Dividend Discount Model. All of them rely on personal assumptions made by the analysts, as it is difficult to predict the future, especially for young unprofitable companies.

Then, the report will analyze the case of the Unicorn Snap Inc., parent company of Snapchat, which raised billions of dollars on the private market reaching a valuation of $20B, just to see it fall after the IPO. In conclusion, the chapter will include an analysis on the company's share price performance until today.

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[1] VC: Venture Capital

1. "Unicorns": Economics and growth

Ancient Greeks and Romans once described unicorns as incredibly rapid and light on their feet, with a horn that was highly prized by traders and investors. It's a characterization that can also be attributed to today's unicorn start-ups. The term "unicorn" was first used in this context in 2013 by Venture Capitalist Aileen Lee to describe privately held organizations with less than 10 years of life and a valuation above $1 billion. She chose this term to emphasize the rarity of these start-ups, as at that time we could count just 39 of these companies. In fact, building a private company worth more than $1 billion was just a dream and an aspiration for few people.

Through this chapter we are going to describe Unicorns' characteristics, who are these companies and where they come from.

Then, the report will describe how these tech start-ups raise the money and are able to reach huge valuations.

Finally, we will analyze the advantages and disadvantages of staying private o going public.

1.1 General introduction

As just said, when Aileen Lee chose the term "Unicorn" was because of the rarity of these companies. The situation has changed a lot over the years and being a unicorn is becoming almost "common" for a tech start-up. As of January 2021, there are over 500 unicorns around the world[2].

Figure 1: Number of Unicorns over the years
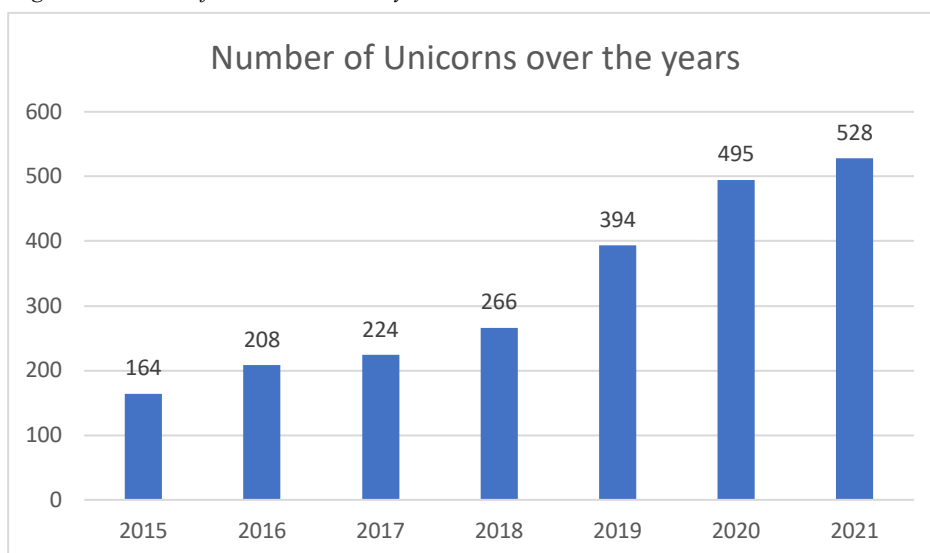
Data source: CBInsights, Crunchbase, TechCrunch (Personal Elaboration)

As it is possible to see from Figure 1, the number of unicorns has reached around 5 times the

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[2] Data source: https://www.cbinsights.com/research-unicorn-companies (updated as of 11/01/2021)

number of 6 years ago. Moreover, these numbers represent those companies who are still considered Unicorns during each year, without counting all of those that have been bought or gone public. This consideration helps to realize that this phenomenon is even bigger. As shown in Figure 1, the number of Unicorns is not showing any sign of slowing down.

There are many reasons why these companies are becoming more and more popular. According to Kenney and Zysman[3], the dot-com bubble has eased the birth of these companies. The availability of low-cost infrastructure, open-source software and cloud computing has facilitated new start-ups to enter the market and disrupt a wide variety of business sectors.

Another reason is that there are huge amounts of capital and low interest rates, since 2011. This has brought big investors in the private market. Since Unicorns are mostly consumer and enterprise software start-ups, they have a lean structure with the possibility of a high earning's potential. The possibility of making huge returns attracts many players, such as venture capital funds, angel investors or private equity. These investors compete with each other to find "the next Facebook", focusing on potential customers or potential growth, but without taking into account the actual performance of the company. Therefore, this leads to those huge valuations that are the at the base of this report.

Another possible reason for the advent of Unicorns is that many of these companies prefer to stay private than go public. Behind this decision there are all the strict rules and procedures that going public would involve. Being a listed company implies a lot of external pressure and the risk of hostile investors. Moreover, the amount of private funding is often enough to grow.

1.1.1 Who are they?

In the previous paragraph, we have analyzed the growth in numbers of Unicorns and the reasons why. However, the real question is: who are these companies?

Besides being all private companies with at least $1B valuation and less than 10 years of life, they have many similarities[4]:

- They all rely to some degree on venture capital for their initial investment, growth and exit. The degree to which VC funds are required varies according to the approach they follow. For example, an organic growth plan needs less money than an inorganic model.
- Most of them expand organically, while only a handful grow by absorbing new companies through mergers, acquisitions or take-overs.

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[3] Kenney, Martin & Zysman, John, "Unicorns, Cheshire cats, and the new dilemmas of entrepreneurial finance." Venture Capital, 2019
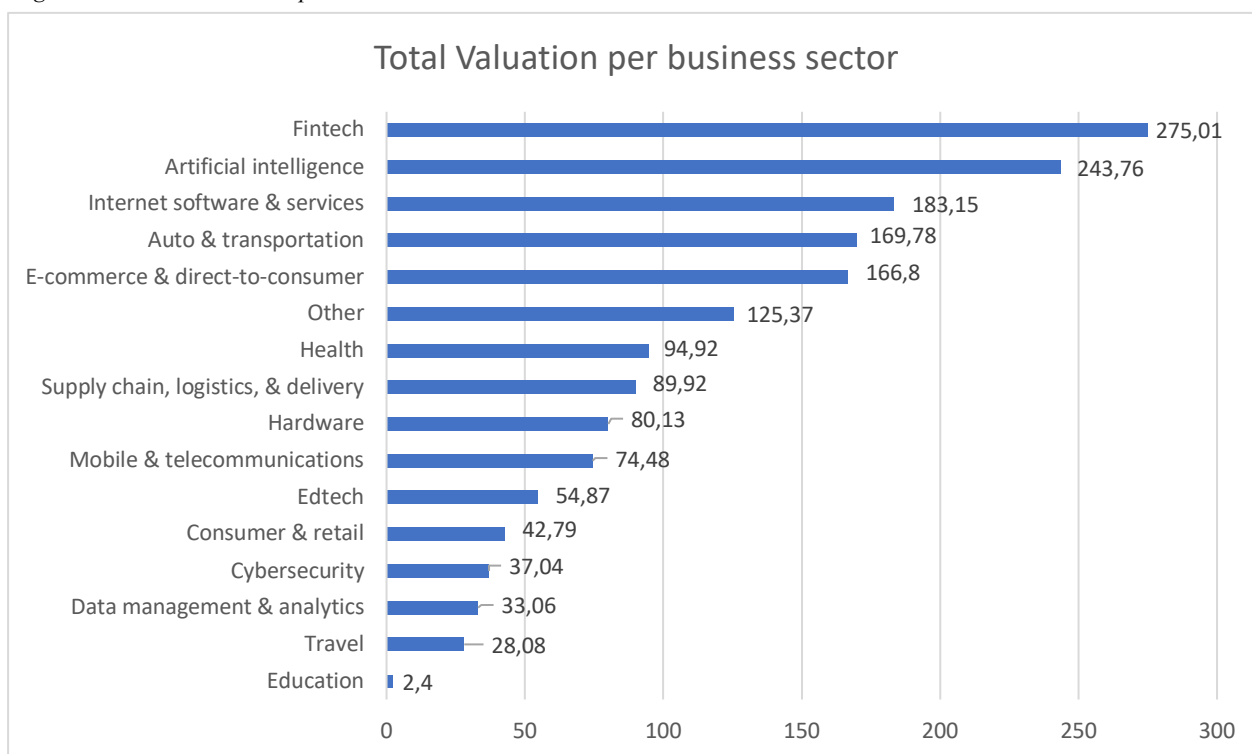[4] Jean Paul Simon, "How to catch a unicorn. An exploration of the universe of tech companies with high market capitalisation", Institute for Prospective Technological Studies, 2016

- The founders are often "serial entrepreneurs" who have already started up other businesses. Most of them are experienced industry people with a good academic history.
- Many unicorns have a considerable amount of R&D expenses.

The mobile internet wave of the last 10 years and the advent of smartphones and applications have signed the beginning of the digital transformation. Thanks to this technological innovation and using successful strategies, Unicorns have disrupted existing markets or created new ones. Mostly, they are transforming entire industries, i.e. financial services, bringing the digital and the physical world together.

As proof of the digital transformation that is happening, we can observe in Figure 2 that 41% of the total $1,700B belongs just to three sector, Fintech, Artificial Intelligence and Internet Software & services.

Figure 2: Total $B Valuation per business sector

Total Valuation per business sector

Sector	Value
Fintech	275,01
Artificial intelligence	243,76
Internet software & services	183,15
Auto & transportation	169,78
E-commerce & direct-to-consumer	166,8
Other	125,37
Health	94,92
Supply chain, logistics, & delivery	89,92
Hardware	80,13
Mobile & telecommunications	74,48
Edtech	54,87
Consumer & retail	42,79
Cybersecurity	37,04
Data management & analytics	33,06
Travel	28,08
Education	2,4

Data source: CBInsights (Personal Elaboration)

The biggest business sector by valuation is also the one with the highest number of Unicorns, 79. Fintech is followed by Artificial Intelligence thanks to Bytedance, a Chinese software company worth $140B known for its content platform Toutiao and social media TikTok. Other than this, the total valuation goes along with the number of Unicorns. Internet software & services is the second largest industry represented, with 74 companies and a total valuation of $183B. Auto &

Tansportation is the fourth industry per valuation led by Didi Chuxing that is the second biggest company with $62B of valuation, as shown in Figure 3.
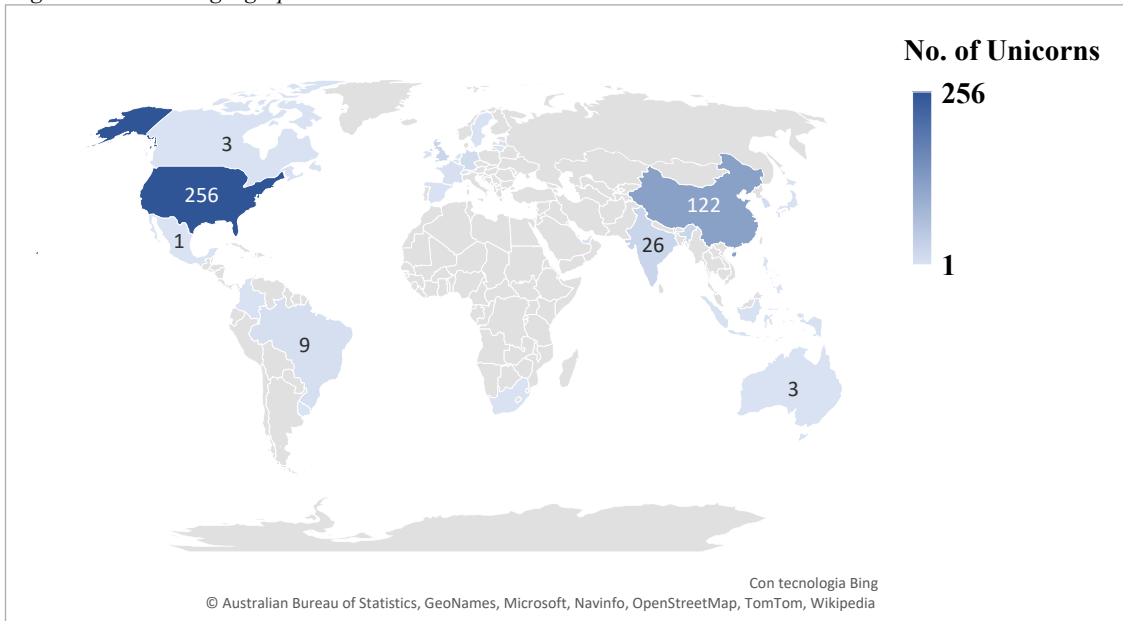
Figure 3: Top 10 Unicorns

Company	Valuation ($B)	Country	Industry
Bytedance	$140,00	China	Artificial intelligence
Didi Chuxing	$62,00	China	Auto & transportation
SpaceX	$46,00	United States	Other
Stripe	$36,00	United States	Fintech
Roblox	$29,50	United States	Internet software & services
Rivian	$27,60	United States	Auto & transportation
Kuaishou	$18,00	China	Mobile & telecommunications
Instacart	$17,70	United States	Supply chain, logistics, & delivery
Epic Games	$17,30	United States	Other
One97 Communications	$16,00	India	Fintech

Data source: CBInsights (Personal Elaboration)

We can easily notice from Figure 3 that the top 10 is leaded by U.S and Chinese companies. After the hectacorn Bytedance and the "Chinese Uber" Didi, we can find Elon Musk's space travel company SpaceX with a valuation of $46B.

Considering that most of the Unicorns are High-Tech companies, they were and they are mostly bundled around Silicon Valley in California. The reason of this concentration is to be found in the skills and opportunities that come from that area. Being recognized as the home of most of the biggest tech companies in the world, bring investors and new entrepreneurs around in order to exploit all the resources that this "cluster" can give. However, during the last years it is becoming more and more common to see new Unicorns from all over the world. Thanks to a rapid modernization and growth of its economy, China has become the second tech center per number of Unicorns and total valuation.

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© Australian Bureau of Statistics, GeoNames, Microsoft, Navinfo, OpenStreetMap, TomTom, Wikipedia

Data source: CBInsights (Personal Elaboration)

United States and China, with respectively 256 and 122 Unicorns, are home of the 71.6% of the total 528 Unicorns. India and United Kingdom come after with 26 companies each, followed by Germany with 15 and South Korea with 11. Europe as a whole has a total of 65 Unicorns.

1.2 Private Financing

Every Unicorn has started with an idea or a problem to solve before disrupting an existing market or creating a new one. Especially in early stages, start-ups need a lot of money to make those ideas work. In the last decade, the amount of funding raised by private companies has reached new levels.

Figure 5: Global Funding by month as of November 2020

Source: Crunchbase, Monthly funding recap

As shown in Figure 5, during the last two years the average private funding per month has reached around $24B. Not even the global pandemic has stopped this phenomenon.

The report has already mentioned what are the drivers of this research of "the new Facebook". This scenario is fed by Venture Capitalists (VC)[5]. They are chasing absurd expected returns and they may have lost focus on Valuation assessment, on which we will go through in the next chapter. The high valuations are a cause and a consequence of a series of funding rounds.

1.2.1 Financing stages

The path and the timeline for funding is different for each start-up. Many companies spend a lot of time searching for funding, while others may go over some of the funding rounds and move more quickly through the process of raising capital. Unicorns usually belong to the latter case, being companies with revolutionary ideas or backed by successful entrepreneurs.

Investors, such as VCs, finance certain start-ups in exchange of a part of equity. This capital is needed to make investments and continue to grow.

Every round is based on different factors. Before a funding round, analysts need to make a valuation of the company based on the management, the market size, the risk and results obtained. Together with growth estimations and maturity level, these factors influence the type of investors to involve. The very first stage of funding usually comes from the founders, family or friends and it involves the capital needed to first develop the idea.

Then, the first official stage is the "seed" funding. These capitals will help the company to move its first steps and to finance market research or product development. The founders present a business plan to investors, usually venture capital, incubators or angel investors. During this phase, the risk of default is very high because the company does not have revenues yet and it still has to go on the market. Therefore, the amount of capital can vary a lot, but it is usually between $10,000 and $2 million.

The product or service is then offered on the market and the company will be focused on reaching the highest customer base possible trying to minimize costs. At this point, the start-up may need new capitals to optimize the business, make new investments or access new markets. Series A funding is really important for the survival of the company, which needs to have a solid plan for long-term profit. During this stage the amount of capital raised used to be approximately from $2 million to $15 million, but with the advent of Unicorns $15 million is the average[6]. Investors are looking for the best new idea, but it need to be backed up by a strong strategy to make that idea profitable. In Series A round we can start to see the interest of big venture capital firms, like

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[5] From now on VC

[6] Fundz. "2020 Series A, B, C Funding Guide: Averages, Investors, Valuations & How to Get Funding."

Sequoia Capital that is investor of many of the top 10 Unicorns. Ensuring a big investor may also help to attract other investors who might want to follow.

In order to go over the development stage, Series B round help the company to expand the market and build a solid business model. If a start-up has gone through Series A, it means that it has developed a good customer base and investors know that it is ready for the next level. This round is quite the same of Series A in terms of processes, but there is the entry of later-stage investors and the average capital raised is around $33 million[7].

Series C funding is reserved to already successful companies that want to expand either organically or acquiring other companies. This round is an opportunity for investors to achieve high returns. In fact, companies at this stage have become less risky and they are now attracting new players, such as investment banks, hedge funds or public investment groups. These new investors are seeking an "easy" way to secure themselves a future big profitable exit through an acquisition or an IPO.

Usually, external private funding used to stop at this round, but it is becoming more common to go over a Series D or even Series E funding.

VC aim is to capitalize the investment made through an exit, represented by an M&A or IPO, and these long series of funding are attracting more and more speculative investors.

1.2.2 Venture Capital's exit

Coming to the Unicorns' world, Venture Capitalists represent the most relevant source of funding. They are a sort of intermediaries; they raise money to invest in the equity of growing private companies[8]. VCs are very important for start-ups because they can provide the necessary funding and guidance through the growing process. They look for companies with high growth opportunities, like mobile, internet software or artificial intelligence, in order to exit the investment with a high return after some years. Obviously, the possibility of big profits comes with high risks that the company could fail or not have the desired success.

Venture Capital's returns depends on the type of exit. There are five types of exit for Venture Capital[9]:

-   IPO (Initial Public Offering): stock market listing of the company;
-   Trade sale: sale of the company to another firm;
-   Management buyout (MBO): VC sells the shares back to the company;
-   Refinancing, or secondary sale: VC sells the stock to another institutional investor;

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[7] Ibidem

[8] Megginson, William, "Towards a Global Model of Venture Capital?", Journal of Applied Corporate Finance, 2002

[9] Schwienbacher, Armin, "Venture Capital Exits. Venture Capital: Investment Strategies, Structures, and Policies", 2009

- Liquidation, when the company files for bankruptcy.

In an IPO the company sells the shares to the public market. The report will go through the advantages and disadvantages in the next paragraph. In this scenario, the IPO is not an exit strategy per se because VC will list its shares on the market which cannot be sold for a determined lock-up period. They will have to sell them after it at the market price. This type of exit is considered as the most profitable for an investor. For a start-up, the decision of going public can be influenced by the desire of the VCs that are backing it to exit their investment. That is probably why an IPO is the most common exit for a Unicorn, which is usually heavily backed by VCs.

The second exit is the sale of the company. In this way, VC can immediately "cash-in" its investment by selling the shares to another private company. There is not many information available because this trade sales are private and do not have to be disclosed. In order for the VC to exit, there can also be the possibility of an exchange of shares with the ones of the buyer, allowing the VC to get less risky shares.

As shown in Figure 6, the proportion between IPOs and acquisitions for Unicorns has increased over the last 10 years. Since 2015, two-third of them were public offerings. 2018 has signed the peak with 55 exits, 75% of which happened through IPO. The data regarding 2020 are updated to October for IPOs and July for the acquisitions.

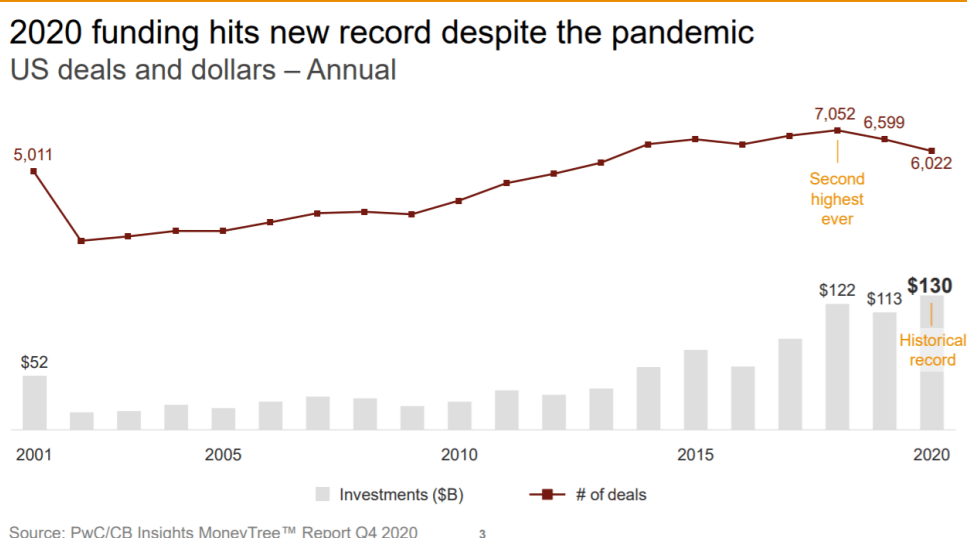*Figure 6: Global Unicorn exits from 2011 to 2020*
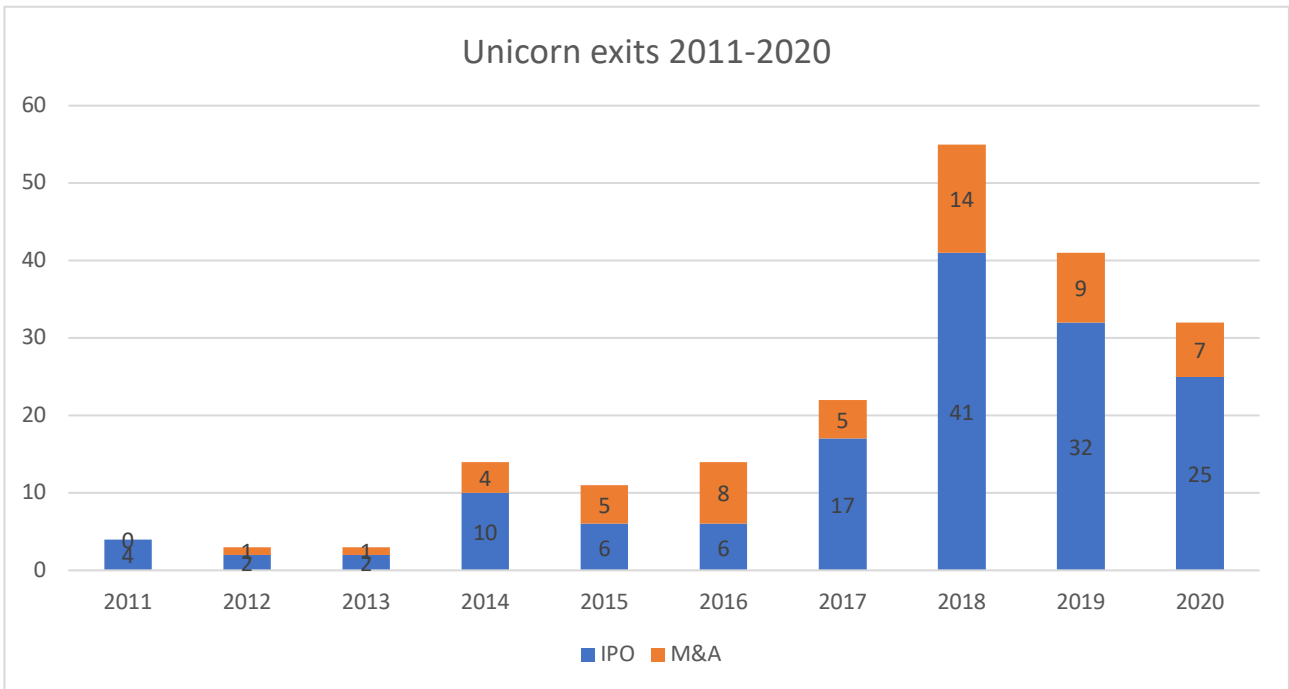
Data Source: Crunchbase, Statista (Personal Elaboration)

Moving on with the different exit types, the last two are MBO or share buyback and secondary sale. These are not very common and, when carried out, they usually do not involve all the shares. The reason behind this is that the VC that is selling need to remain involved as a sort of warranty.

1.3 Staying private or going public?

Until 2018, most of Unicorns preferred to stay private for longer time waiting for the right time to go public. The main reason was the amount of capital available on the private market. Venture Capitalists have increased dramatically the resources invested on the market. From 2010 the total investment in all the funding series have more than quadrupled, signing new records every year. As shown in Figure 7, private funding has managed to hit a new record even during the global pandemic of 2020. This means that investors do not stop to search for opportunities even during a time of difficulty.

Figure 7: Total private funding from 2001 to 2020

It is easy to understand that, under these circumstances, a private company does not need to go public to raise the capital necessary for the growth.

Another reason that kept Unicorns private is to be found in in 2012 US JOBS Act. This law increased the number of shareholders that a company could have before having to disclose financial data to the SEC. The new threshold passed from 500 to 2000 shareholders. So, it was easier to raise more capital from different investors and to wait more time before being listed.

More time the Unicorns remained private, more challenging became the IPOs. It is known that the public market rewards companies with solid structures and stable profits, while private tech start-ups were basically valued on the expected growth. These fears have become reality with a series

of disastrous IPOs, like Uber, Snap or Lyft because of the lack of profits or like WeWork that, thanks to an inadequate corporate governance had to step back from going public.

Despite this, in 2018 some of the highest valued Unicorns decided to go public, triggering a reaction in other companies that followed them. But why going public if not ready?

Santosh Rao, from Manhattan Venture Partners, said in 2019 that Unicorns were rushing their IPO to "ride the wave" of a bull market before being caught in the burst of a bubble.

One of the reasons is to be found on the excitement of investors on this type of companies. Unicorns are connected with disruptive ideas and innovation, so they create big hype around them with the public anxious to invest on them. Unfortunately, the majority of these IPOs proved to underperform in the first years because the high valuations of the private market are not matched once public.

A key benefit of the IPO is that it will provide access to funding in amounts that Unicorns cannot find elsewhere. It also offers unicorn companies and their founders a chance to reward and attract the talent that has been key to their growth so far. It offers investors, primarily Venture Capitalists, the chance to exit and make a return on their investment and can raise their brand image and open up opportunities for new users. The whole process requires a solid corporate governance structure and a degree of integrity that "certificates" the organization as a credible business.

However, an IPO also leads to a level of investigation from investors and regulators that Unicorn firms might not be prepared for.

There is not a better choice than another on either staying private or going public. However, it has been possible to notice that there is a discrepancy between private valuations and public ones. The cases of Snap, Uber, Lyft have highlighted a big difference of views between VCs and investors in the public market. There will be the need of a reduction of the gap in valuations. Only the future will tell us if private valuations will drop or IPO's target prices will be lower.

2. Valuation methods of private companies

In the previous chapter, we have seen how the number of Unicorns has increased exponentially, from 164 to over 500, in the last six years. This trend leads to raise some questions about how these companies are evaluated.

Have analysts changed their methods or these companies are really this valuable?

As already said, Unicorns are private companies with less than 10 years of life. For a variety of factors, it is difficult to evaluate these companies. Many of them have little to no profit and operating losses. Even the profitable ones have limited history and depend mostly on founder's savings, venture capital and private equity. Considering these factors, it is difficult for analysts to predict what will happen in the future.

In this chapter, we will present the three most reliable valuation methods: the multiple analysis, the Discounted Cash Flow (DCF) and the Dividend Discount Model (DDM).

The aim is to provide a general overview of how these methods work and when is best to use them or not. These approaches are all based on the Law of One Price, which implies that the price of a security (a stock in our case) should be determined by the expected return that an investor would have[10]. Therefore, even if two analysts use the same method, they could get different results based on personal assumptions and forecasts on future cash flows.

Then, trying to answer to the question raised, we can say that analysts have changed their expectations on the future, especially in a disruptive market such as the technology one.

2.1 Multiple analysis

The multiple approach is one the easiest and fastest method to evaluate a company, but also the least reliable. It is based on Law of One Price, but instead of using the cash flows, it relies on the assumption that comparable firms with similar cash flows will have the same value. In order to compare them, accounting ratios are used. These are called valuation multiples and express the market value of a key statistic that is assumed to be a good proxy for the stock value. These multiples, as we will analyze in the next paragraph, can be divided into two categories: equity multiples and enterprise multiples.

The analysis basically consists of three steps[11] to determine the value of a company:

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[10] Cf. J. Berk and P. DeMarzo, "Corporate Finance", pag 309, 4th ed., Global Edition, Pearson Education, 2017
[11] Source: https://corporatefinanceinstitute.com/resources/knowledge/valuation/multiples-analysis/

1. Identification of comparable companies, in terms of operating and financial characteristics, industry;

2. Definition and standardization of the market value of each company and creation of valuation multiples;

3. Identification of the target company's value through the application of valuation multiples.

The report will describe the most used ratios and how to follow the three steps of this method. Then, it will outline the advantages and disadvantages of the multiple approach.

2.1.1 Equity multiples

Equity multiples are based on key statistics related to the shareholders' claims on the firm. These multiples consider the equity value, that is the price of the shares on the market, divided by a financial parameter of the company. There are four equity multiples that are usually used: price on earnings, price on book value, price on sales and price on cash flows.

The most used is the "price on earnings" (P/E[12]) and it is simply calculated dividing the price of a company (P) by the earnings per share (EPS). It represents how much time it takes for the earnings to recover the price paid by a shareholder. It is based on the assumption that, when an investor buys a share of a company, he is buying the rights on future income.

$$\frac{P}{E} = \frac{Share\ Price}{Earnings\ per\ share} = \frac{Market\ capitalization}{Earnings}$$

<div align="right">*eq. 2.1*</div>

This formula is used to estimate the value of the target company by multiplying its EPS by the average P/E ratio of comparables. It is possible to calculate this ratio using different data, as the EPS are an accounting measure. It is best to use this multiple when earnings follow a certain trend and growth. We can estimate the ratio using the dividend growth model (it will be explained later in this chapter). The model states that the share price at time 0 is equal to the dividends per share expected at time 1 discounted at the cost of equity (k_E) minus the EPS growth rate (g).

The "forward P/E" can be estimated as follows:

$$\frac{P_0}{EPS} = \frac{Div_1/EPS_1}{k_E - g_{EPS}} = \frac{Dividend\ payout\ rate}{k_E - g_{EPS}}$$

<div align="right">*eq. 2.2*</div>

The assumption behind the use of this formula is that if two companies has the same dividend payout rate, cost of equity and EPS growth, then they will have the same P/E.

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[12] From now on P/E

This multiple has many inefficiencies, in fact it cannot be always used. It relates on the assumption that the comparables are fairly priced. Then, earnings can be affected by different accounting policies and they can also be negative[13]. They can also be influenced by the moment of a company, therefore past earnings would not be representative of future earnings.

Another multiple we are going to analyze is the "price on book value" (P/BV):

$$\frac{Share\ price}{Book\ Value/number\ of\ shares} = \frac{Market\ capitalization}{Book\ Value}$$

eq. 2.3

This multiple represents the investment that shareholders have made in the company, instead of the cash flows that they will receive. It is more useful when tangible assets are a primary source of value generation[14].

Another widely used multiple is "price on sales":

$$\frac{Share\ price}{Revenues/number\ of\ shares} = \frac{Market\ capitalization}{Sales}$$

eq. 2.4

A positive aspect of using this multiple instead of P/E is that revenues/sales cannot be negative and are not affected by accounting policies or the capital structure of the company. It would be fair to use this multiple, for example, when two comparables have a different structure because with similar revenues they could have really different earnings.

The last equity multiple to analyze is the "price on cash flow" (P/CF):

$$\frac{Share\ price}{Cash\ flow/number\ of\ shares} = \frac{Market\ capitalization}{Cash\ flow}$$

eq. 2.5

The P/CF ratio considers cash flows, which are not affected by accounting policies and represent important drivers for a company's profitability. Furthermore, cash flows are more likely to be stable and follow a pattern.

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[13] Cf. F. K. Reilly and K. C. Brown, "Analysis of Investments and Management of portfolios", 9th ed., Thomson South- Western, 2009
[14] Cf. P. Suozzo, S. Cooper, G. Sutherland and Z. Deng, "Valuation Multiples: A Primer", Global Equity Research, UBS Warburg, Nov. 2001

2.1.2 Enterprise multiples

Enterprise multiples are based on the enterprise value (EV) of a company, which is the sum of the equity value and net debt[15]. Since they measure the total value of a company, they are more useful with companies with a different financial structure.

The most common multiples are EV/EBITDA, EV/EBIT and EV/Sales.

The first that will be analyzed is EV/EBITDA, that is also the most used because EBITDA is an indicator not influenced by accounting policies or capital structure. The enterprise value can be calculated using free cash flow, cost of capital (WACC) and FCF growth rate. Therefore, the formula of the multiple will be:

$$\frac{EV_0}{EBITDA_1} = \frac{FCF_1/EBITDA_1}{k_{WACC} - g_{FCF}}$$

eq. 2.6

Despite its wide use, this multiple does not take into account capital expenditures or research and development expenses that are key indicators for the future growth of a company.

In order to solve these problems, it is useful to consider another multiple, that is EV/EBIT:

$$\frac{EV_0}{EBIT_1} = \frac{FCF_1/EBIT_1}{k_{WACC} - g_{FCF}}$$

eq. 2.7

EBIT reflects some aspects ignored by EBITDA, such as capital expenditures, amortization, depreciation or R&D. However, depreciations and amortization are two items that often depend on accounting regulations. Therefore, this multiple should be used when comparing companies under the same regulation or it would be necessary to adjust the EBIT before using it.

The last enterprise multiple to consider is EV/Sales:

$$\frac{EV_0}{Sales_1} = \frac{FCF_1/Sales_1}{k_{WACC} - g_{FCF}}$$

eq. 2.8

The limits of this multiple are the same seen with the P/S. In fact, it is based just on revenues, excluding important information such as the financial management and structure. However, EV/Sales ratio is useful when we compare companies with different accounting policies or capital structure, but especially with companies that still have negative figures or negative earnings.

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[15] Net Debt = Debt - Cash

As analyzed, every multiple has its advantages and disadvantages and there is not one better than another. The best fitted multiple depends on the industry of the target company, its stage of life and capital structure.

2.1.3 Conclusion

Multiple analysis is the is very common and easy because it requires minimal information. However, it relies on market values of comparable companies, taking them as good and not considering the irrationality of investors.

Moreover, this valuation is just a picture of a company at a specific point of time, without taking into consideration business' dynamics and developments.

Furthermore, it is almost impossible to reach an extremely accurate result because we should choose comparables that are as similar as possible to the target company, but in reality, we cannot find identical companies.

For the reasons explained, the multiple analysis can be used together with other valuation methods, to compare them, but, alone, it does not lead to reliable results.

2.2 The Discounted Cash Flow Model

The Discounted Cash Flow (DCF[16]) model allow us to estimate the stock price of a company by discounting cash flows at the cost of capital. It is considered to be one of the most efficient method as it uses multiple information from the company's financial data. The DCF allow us to estimate the enterprise value that, as explained in the previous paragraph, is the total value of the firm (equity value plus net debt.

The DCF model has three different applications: the WACC[17] method, the Adjusted Present Value (APV) method and the Flow to Equity (FTE) method. In this report we will focus only on first one, that is the most widely used.

In order to go through the explanation of the WACC method, we will analyze the two components: the free cash flow and the cost of capital. Then, as for the multiple approach, the report will focus on the advantages and disadvantages of this valuation method.

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[16] From now on DCF
[17] Weighted Average Cost of Capital

2.2.1 The Free Cash Flow and Cost of Capital

The first component that needs to be calculated is the free cash flow (FCF[18]), which is the cash flow available to pay both shareholders and debtholders[19]. The formula to estimate it is:

Free Cash Flow = EBIT * (1 – t) + Depreciation + Amortization – Capital Expenditures - ΔNWC

<div align="right">

eq. 2.9

</div>

EBIT stands for earnings before interests and taxes; *t* is the tax rate; capital expenditures are capital investments made by the company; ΔNWC is the difference between this year's Net Working Capital and last year's. The NWC is a measure of a company's liquidity and its short-term financial health[20]. Its formula is:

NWC = operating assets – operating liabilities =
= (Accounts receivables + Inventories + Prepaid expenses) –
(Accounts payables + Accrued expenses)

<div align="right">

eq. 2.10

</div>

Going through the FCF formula we can see that: the EBIT needs to be after tax (*1-t*); depreciation and amortization are added as they are non-cash expenses; capital expenditures represent an outflow of cash that is not included in EBIT, being split over the years in the financial statements; ΔNWC needs to be subtracted because, for example, an increase in accounts receivables leads to a decrease of liquidity for the firm.

The second component of the DCF model is the cost of capital at which the free cash flows are discounted. As already mentioned, we will use the WACC as cost of capital. The weighted average cost of capital represents the cost of both equity and debt proportionally.

The formula to calculate it is:

$$k_{WACC} = \frac{E}{E + D} * k_E + \frac{D}{E + D} * (1 - t) * k_D$$

<div align="right">

eq. 2.11

</div>

E is the market value of equity while D is the market value of debt (net of cash). The latter is considered after tax (*t*) because the method takes into account the interest tax shield[21]. Then, k_E is the equity cost of capital and k_D the debt cost of capital. One of the main problems of the model is the proportion between equity and debt, which leads to a different WACC every time it changes. Therefore, in this report we will assume that this proportion is constant over time.

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[18] From now on FCF

[19] Cf. J. Berk and P. DeMarzo, "Corporate Finance", 4th ed., Global Edition, Pearson Education, 2017

[20] Source: https://www.investopedia.com/terms/w/workingcapital.asp

[21] Interest tax shield = reduction in taxable income due to the deduction of interest expenses

In order to compute the WACC, we have to estimate both equity and debt cost of capital. Starting with the former, k_E is the expected return a shareholder should receive when investing in the company. The most commonly used method to estimate it is the Capital Asset Pricing Model (CAPM[22]), that relates the expected return of a security with its systematic risk. The equation for the cost of capital is:

$$k_E = E[r_i] = rf + \beta_i * (E[r_{mkt}] - rf)$$

eq. 2.12

In the equation the expected return of the target company i ($E[r_i]$) equals the return of a risk-free security (r_f) plus the Equity Risk Premium ($E[r_{mkt}]$ - r_f) multiplied by the Beta (β_i).

The risk-free rate is usually recognized in the three-month U.S. Treasury bill, which is considered safe and without the risk of default. When evaluating a European company, we can also use the German Bunds as they have the lowest risk of default. In other circumstances, the bonds of AAA rated companies can be used as risk-free rate.

$E[r_{mkt}]$ represents the return of the market, which corresponds to the weighted average of returns of all the securities on a financial market. Given the huge number of securities, we can approximate the calculation by using the return of indexes with the highest number of securities or the most relevant ones. That is why the most used index is the S&P 500[23], along with the Dow Jones or the Wilshire 500[24]. The Equity Risk Premium (ERP) is then represented by the additional return expected by investors to invest in the market instead of on a risk-free security.

The most complex element of eq. 2.12 is the calculation of β_i. It measures a security's sensitivity to the movement of the market. The market has a beta of 1 by definition. Finding a stock's β is fundamental to estimate its expected yield. In fact, a β higher than 1 would mean that the stock's systematic risk is higher than the market. Therefore, being riskier, it must offer a higher yield to convince investors to put money on it.

The calculation of the beta follows a different process if the target company is publicly or privately held. The reason lies on the information available by analyst. The computation of the β of a public company relies on its historical returns. It is necessary to run a linear regression of the historical returns of the company and the market. The β is defined as the slope of the best-fitting line in the plot of the security's excess returns versus the market excess return[25]. The calculation is quite simple and using a program like Excel and all the data provided by databases such as Bloomberg.

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[22] From now on CAPM
[23] Index with the 500 largest U.S. public companies
[24] Cf. J. Berk and P. DeMarzo, "Corporate Finance", 4th ed., Global Edition, Pearson Education, 2017
[25] Ibidem

For private companies, the process is longer due to the lack of historical returns. The first step is to find, like in the multiple analysis, comparable companies that are in the same industry, with similar structure and they must be listed. Then, for each comparable we need to compute the β, the D/E[26] ratio and the tax rate and calculate the average among them. The average beta found is defined beta levered because it is levered considering the capital structure of the peer companies. In order to apply the average beta to the target company, it is necessary to unlever it using this formula:

$$\beta_u = \frac{\bar{\beta}_L}{1 + (1 - \bar{t}) * \frac{\bar{D}}{E}}$$

<div align="right">eq. 2.13</div>

where β_u stands for beta unlevered, β_L for beta levered, t the tax rate and D/E the debt-to-equity ratio (the high dash on β_L, t and D/E indicates that they are the average). Once we have found the unlevered beta of the target company, we need to re-lever it with its capital structure. The D/E ratio of the target company must be used in this formula:

$$\beta_L = \beta_u * \left[1 + (1 - t) * \frac{D}{E}\right]$$

<div align="right">eq. 2.14</div>

This process is not as accurate as the linear regression used for public companies because we have compared a private company with some comparable companies that are listed and react to the market. Having defined the beta, we have all the components to estimate the equity cost of capital. Now, in order to compute the WACC, we need to analyze the debt cost of debt (k_D). A simple way to compute it would be through a bond issued by the target company. The interest rate paid is a good proxy for the risk of default and rating agencies give the company a rating that goes from AAA to D. This rating depends on the probability of default and are associated with a corresponding default spread, which is the return that a company should pay in addition to the risk-free rate. The higher the rating of a company the lower is the return on its bonds.

In the case of a target company that is not rated, we can assign a rating through the estimation of the interest coverage ratio, which determines how easily a company can pay its debt's interests[27]:

$$Interest\ Coverage\ ratio = \frac{EBIT}{Interest\ expenses}$$

<div align="right">eq. 2.15</div>

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[26] Debt/Equity
[27] Cf. https://www.investopedia.com/terms/i/interestcoverageratio.asp

A rating is assigned based on the result of this ratio[28]. As said, for every rating level, there is a spread that needs to be added to the risk-free rate to compute the target company's debt cost of capital (before tax). This is the most useful method when trying to estimate the cost of debt for a non-listed company that, as such, has no rating.

Now that all the components of the WACC are estimated, we can go through with our DCF model and find the enterprise value of the company. The model is based on this formula:

$$EV_0 = \frac{FCF_1}{(1+k_{wacc})^1} + \frac{FCF_2}{(1+k_{wacc})^2} + \frac{FCF_3}{(1+k_{wacc})^3} + \ldots = \sum_{n=1}^{\infty} \frac{FCF_n}{(1+k_{wacc})^n}$$

eq. 2.16

The enterprise value is estimated by the sum of the present value of free cash flows discounted to the WACC. Since this sum could go to infinity, we have two different situations. In the first case FCF grow at a constant growth and the eq. 2.16 would become in the form a perpetuity. Therefore, the enterprise value would simply be the FCF of time 1 discounted by the WACC minus the growth rate.

The second case involves a growth rate that is not constant, so we need to assume a rate at which the company would grow after a certain year. Eq. 2.16 will then have a final component, named terminal value:

$$Terminal\ Value = \frac{FCF_n * \frac{(1+g)}{(k_{WACC} - g)}}{(1 + k_{WACC})^n}$$

eq. 2.17

2.2.2 Conclusion

The DCF model is the most reliable and used method to estimate the value of a company. At the same time, it is also one of the most difficult because it is based on forecasts and personal assumptions on the future. Therefore, it is important that all the estimations to determine both free cash flows and cost of capital are as accurate as possible. Small changes can lead to very different results and that is why it is almost impossible to have exactly the same valuation from different analysts.

The WACC method explained in this chapter works best when a company as a constant debt-to-equity ratio. Otherwise, it would be better to use the APV method. The latter add the present value of the interest tax shield to the unlevered value of the company, without taking into account the capital structure.

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[28] Ratings corresponding with the ratio at:
http://pages.stern.nyu.edu/~adamodar/New_Home_Page/valquestions/syntrating.htm

Furthermore, if it would be difficult to determine the value of the debt of a company, we could use the Flow to Equity method, which assesses just the equity value instead of the enterprise.

2.3 Dividend Discount Model

The application of the Dividend Discount Model (DDM) is based on the Law of One Price, for which the price of a stock equals the present value of the expected return an investor will receive. It, then, relies on future cash flows like the DCF. The difference is that in the DCF we consider the cash flows available to the whole firm, while the DDM focuses just on shareholders. Therefore, this model assumes that the only tangible cash flow for a shareholder is dividends and it evaluate the stock discounting them. The DDM calculate, then, the equity value of the target company.

As for the other two methods, the report will go through an analysis of the process of valuation and then discuss the advantages and disadvantages of the model.

2.3.1 Dividends, cost of capital and growth rate

As just said, the only cash flow that an investor will receive by investing in a company is dividends, apart from the cash flow from an eventual sale of the shares. The amount of the dividend is not standard and every firm take its own decision. Obviously, in order to distribute dividends, the company must have positive earnings. Depending on the industry and on the stage of the life cycle of the company, the management may decide to retain all the earnings to reinvest them in the business.

We can see that dividends are strictly related to earnings through the payout rate, which expresses the percentage of earnings that are being paid:

$$Div_1 = EPS * payout\ rate$$

<div align="right">eq. 2.18</div>

where EPS are the earnings per share.

On the other hand, what remains of the earnings can be easily estimated by the retention rate:

$$retention\ rate = 1 - payout\ rate$$

<div align="right">eq. 2.18</div>

This rate represents the money that are reinvested in the firm and that hopefully generates some additional returns. Therefore, the higher the retention rate the higher are the earnings the year after. We can then estimate this growth thanks to the ROI[29] given by the retained earnings:

$$g_{EPS} = retention\ rate * ROI$$

<div align="right">eq. 2.19</div>

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[29] ROI = Return on Investment

This formula links the grow of EPS with dividends. A company, when deciding to pay dividends, can choose to keep a constant payout rate (with a consequent constant growth of earnings) or change it every year. These two situations lead to a different application of the DDM.

Before explaining the differences, we should analyze the discount factor that needs to be used. Unlike the DCF, dividends are discounted by the equity cost of capital (k_E) because we are focusing on shareholder's perspective after everything else is already paid to find the equity value. From an investor point of view, the price of a stock should be equal to the present value of a future cash flow:

$$P_0 = \frac{Div_1 + P_1}{(1 + k_E)}$$

<div align="right">

eq. 2.20
</div>

Where on the numerator there is dividend received plus the price at which the investor would sell the stock. In order to find the equity cost of capital we can use this formula:

$$k_E = \frac{Div_1 + P_1}{P_0}$$

<div align="right">

eq. 2.21
</div>

Now that we have all the components, we can see two different situations to apply the DDM.

As already said, the company could decide to keep a constant payout rate. In the case of an investor who keeps the stock for many years, the price of a share would be the present value of the expected future dividends[30]:

$$P_0 = \frac{Div_1}{(1 + k_E)^1} + \frac{Div_2}{(1 + k_E)^2} + \frac{Div_3}{(1 + k_E)^3} + \cdots = \sum_{n=1}^{\infty} \frac{Div_n}{(1 + k_E)^n}$$

<div align="right">

eq. 2.22
</div>

In a first scenario, the target company decides to keep a constant payout rate, which leads to a constant growth rate of EPS, as seen in eq. 2.19. Therefore, eq. 22 would be:

$$P_0 = \frac{Div_1 * (1 + g)^1}{(1 + k_E)^1} + \frac{Div_1 * (1 + g)^2}{(1 + k_E)^2} + \frac{Div_1 * (1 + g)^3}{(1 + k_E)^3} + \cdots = \sum_{n=1}^{\infty} \frac{Div_1 * (1 + g)^n}{(1 + k_E)^n}$$

<div align="right">

eq. 2.23
</div>

Since it is a perpetuity, the formula becomes:

$$P_0 = \frac{Div_1}{k_E - g}$$

<div align="right">

eq. 2.24
</div>

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[30] Cf. J. Berk and P. DeMarzo, "Corporate Finance", 4th ed., Global Edition, Pearson Education, 2017

This is defined as the Constant Dividend Growth Model, according to which the value of the firm depends on the dividend level for the coming year, divided by the equity cost of capital (k_E) adjusted by the expected growth rate (g)[31].

In the second scenario, the management of the target company choose to change the payout rate every year. As we have seen for DCF model, we cannot go to infinity so we need to estimate a constant rate that will continue after some years. Then, assuming a three-year horizon, eq. 2.23 would be:

$$P_0 = \frac{Div_1}{(1 + k_E)^1} + \frac{Div_2}{(1 + k_E)^2} + \frac{Div_3}{(1 + k_E)^3} + \frac{Div_3 * \frac{(1 + g_3)}{(k_E - g_3)}}{(1 + k_E)^3}$$

eq. 2.25

2.3.2 Conclusion

Together with the DCF, the Dividend Discount Model is one of the most reliable methods to evaluate a company. It is based on dividends that are easier to estimate than DCF's free cash flow. However, it has many limitations, such as the dependency on assumptions and predictions, not only on earnings but also on the payout rate and long-term growth. Moreover, the reliance just on dividends leads to ignore other aspects that could bring cash flows to shareholders, such as share buybacks.

The application of the DDM relies on data that, for private companies, could be difficult to find. Therefore, evaluating a non-listed company with this method could lead to unreliable assumptions and a falsified result.

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[31] Cf. J. Berk and P. DeMarzo, "Corporate Finance", 4th ed., Global Edition, Pearson Education, 2017

3. A shot of Snap's IPO

Snap Inc. is the company behind Snapchat, a messaging and multimedia app with which users are able to send instant photos, videos or texts that disappear after a few moments. During 2020, helped by the global pandemic, have had an average of 245 million daily users[32].

In 2017 the company have gone public after achieving a valuation of around $20 billion on the private market. Despite first day hype, the stock has been exchanged at a price below the IPO's $17 per share until the first half of 2020.

The report is going first through a description of the company and its history and then it will analyze what led Snap to go public.

Finally, we will evaluate the company to see if the price offered on the market was right, considering all the personal assumptions that could go into it.

3.1 The path towards a Decacorn's valuation

Snap was created in 2011 by three student at Stanford University, Evan Spiegel, Robert Murphy and Frank Reginald Brown. The latter came with the idea, wishing that he could send photos and messages to girls that could disappear after a few seconds. The trio worked on it and launched an IOS app called "Picaboo" with Spiegel as Chief Executive Officer (CEO), Murphy as Chief Technology Officer (CTO) and Brown as Chief Marketing Officer (CMO), with the latter that also designed the ghost logo still used today. The app allowed to send self-deleting photos, with the possibility of choosing how long the pictures could remain visible.

Unfortunately, despite the potential, after a few months the app had just 127 active users. The three friends started thinking about new strategies but soon there were tensions between them, leading to the exit of Brown from the company. Later, he filed a lawsuit against Spiegel and Murphy who had to pay $157,5 million in 2014.

The two founders proceeded to change the name of the app to "Snapchat" and started to advertise it. By the end of 2011, the app had an exponential growth reaching 1.000 DAU[33] and on to 100.000 DAU in 2012. This success started to attract investor and in May 2012 Snapchat received a $485.000 from Lightspeed Venture Partners to support the growth. Thanks to this, Spiegel decided to drop out of college to focus on the company. The investment allowed to extend the app to Android users and to launch a video support. The increased popularity led to the attention of competitors and Facebook tried to launch a similar app, "Poke", but it was a flop and could only increase Snapchat's reputation.

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[32] Data retrieved from Statista: "Number of daily active Snapchat users from 1st quarter 2014 to 4th quarter 2020"
[33] DAU = Daily Active Users

In February 2013, the company raised $13,5 million through a Series A financing round led by Benchmark Capital, leading the company to a valuation of $60/$70 million.

The growth was exponential and by April 2013 there were 150 million pictures exchanged every day. While the company reached a $800 million valuation through a $80 million Series B round, questions over long term revenue streams started to raise. Despite this, the user base was unstoppable and daily snap reached 200 million per day, while Snapchat launched the new "Story" function, which enabled users to share a moment through pictures and videos.

At the end of 2013, Mark Zuckerberg's Facebook tried to buy the company with an offer of $3B that was sent back by Spiegel, despite the lack of revenues. By the end of the year, a Series C round made Snapchat raise additional $50 million with a valuation of $2B and reaching the Unicorn status.

New features were launched, like Smart Filter functions, while the app was hacked and new vulnerabilities were found. The Federal Trade Commission (FTC) filed a lawsuit, then settled, accusing Snapchat to fool users with the deletion of pictures, while it was possible to save them through other applications without the sender authorization.

After having surpassed 50 million DAU in 2014, Snapchat launched "Our Story", to allowed users to add their snaps to an event story. This feature allowed to start monetizing the platform when, during 2014 American Music Awards, Samsung paid to include ads between the snaps uploaded to the event. Investors were excited about it and a new Series D round translated to $485 million investment, with a valuation ranging from $10B to $20B.

In 2015 Snapchat acquired the smart recording-glasses producer Vergence Labs and the company AddLive, launching video chat features and text. Geofilters, Lenses and the Discover feature were added that same year, stimulating users' growth to 100 million DAU and taking in new advertising partners like ESPN or National Geographic.

After having secured $200 million funding in 2015, a $1,8B Series F led to a valuation of $20B in 2016. This financing helped Snapchat to introduce its first hardware product Spectacles, sunglasses with an in-built camera to record videos, but they later revealed as a flop.

Halfway in 2016, the company decided a rebranding, changing the name from Snapchat to Snap Inc. The Chief Strategy Officer Imran Khan said: "We rebranded because we are bigger than just on app…Snap Inc. is a camera company – we believe that reinventing the camera represents our greatest opportunity to improve the way people live and communicate."

Following the ambition behind this statement, at the end of 2016 rumors about the IPO started to spread. February 2017, Snap filed the documents to the SEC and, with JP Morgan and Morgan Stanley as underwriters, was looking to sell shares at a price between $14 to $16. Since institutional investors showed interests, the underwriters decided to adjust the price to $17 per share.

In Figure 8 below, it is possible to see all the financing rounds that led to the $20B valuation with its $2,6B of funds raised.

Figure 8: Snap's private funding rounds

Round	Date	$m Amount	$m Valuation Range	
Seed	May-2012	0,485	-	-
Series A	Feb-2013	13,5	60	70
Series B	Jun-2013	80	800	-
Secondary Market	Jun-2013	20	-	-
Series C	Dec-2013	50	2.000	-
Series D	Dec-2014	485	10.000	20.000
Series E	Mar-2015	200	16.000	-
Series F	May-2016	1.800	20.000	
Total		**$ 2.649**		

Data source: Crunchbase (Personal Elaboration) (numbers in million)

3.1.1 What brought them to go public?

The best time to go public for a company depends on different criteria. A company will only decide to go public when it is advantageous to do so: it wants to be sure that the economy is doing well, and investors sentiment is advantageous. Furthermore, an amount of different market conditions, such as the intensity of competition and market growth rate, are taken into account to decide about a potential IPO. At the time of Snap going public, the IPO landscape could be described as follows: despite the S&P 500 index hitting a record high, combined with high average IPO returns (23% from the offering price), there was a big drop in IPO activity.

Figure 9: US IPO proceeds fall to the lowest level since 2009

Key US IPO Statistics - Activity								
IPO Volume	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Number of Deals	63	154	124	128	222	275	170	105
Proceeds Raised (US$ in bil)	$21.9	$38.7	$35.5	$42.6	$54.9	$85.3	$30.0	$18.8
Median Deal Size (US$ in mil)	$155	$108	$160	$124	$126	$100	$94	$95
PE-Backed Deals	22	38	35	45	68	71	39	30
PE-Backed Proceeds (US$ in bil)	$6.5	$9.6	$20.4	$10.3	$24.5	$25.0	$11.3	$8.8
VC-Backed Deals	12	61	51	46	82	126	85	42
VC-Backed Proceeds (US$ in bil)	$1.3	$6.0	$7.9	$20.7	$9.7	$35.3	$8.9	$3.5

Source: Renaissance Capital, 2016, "U.S. IPO Market, 2016 Annual Review"

As shown in Figure 9, in 2016 IPOs proceeds were down 37% from 2015 and the lowest level since 2009. The median deal size was under $100 million for the second year in a row. 105 companies

went public, down 38% from 2015 and the lowest level since 2009. The drop in activity was indiscriminate; both VC- and PE-backed IPOs were at their lowest level by both deal count and proceeds.

The fall was caused by several factors such as high levels of uncertainty (Brexit & presidential elections) and low interest rates, making debt a more attractive way of funding. Furthermore, the abundance of private capital funds (a cheaper and faster way for fundraising), as well as the high costs of an IPO process and the high M&A activity contributed to the drought of tech IPOs. Next to this, new developments in the IPO landscape started to emerge: Spotify didn't go for the traditional IPO but explored another path where existing shares are offered directly to the public without any banks underwriting it; a concept known as direct listing. This avoids dilution for existing shareholders and reduces the costs of a deal. Also, the creation of Special Purpose Acquisition Companies, designed to buy private companies and directly bring them public, gave the landscape a different turn.

Finally, in 2017, improved expectations for the IPO market began to rise, due to the sunnier economic outlook and more certainty on the presidential election. These factors made the Federal Reserve raise interest rates, along with the expectation that interest rates would keep climbing. As a result, debt became relatively more expensive as a funding source for companies to expand their business. Moreover, private equity funds were nearing their exists with IPO as a likely exit strategy. At last, Snap launched its shares into a market that was very hungry for large tech IPOs after the recent drought; its IPO would be very attractive to hungry tech-investors. In addition to these favorable market conditions, opportunistic reasons inspired Snap to go public. The still negative operating cash flow encouraged Snap to look for more financing and raise capital. Furthermore, it had seen steady increase in user base, but this growth might decline in the future due to increased competitive pressure. Then, Snap announced its intention to pursue an IPO in March 2017, with Goldman Sachs and Morgan Stanley as lead underwriters.

At the time of the IPO, Snap faced significant competition both in the U.S. and overseas. The strongest competition came directly from Facebook and Twitter, whose business model to generate revenues is also mainly based on advertising. Next to Facebook and Twitter, also Google and LinkedIn caused significant competitive pressure, even though their business models are not completely similar to the one of Snap.

When comparing the key statistics of Snap's competitors at the time of their IPO as shown in Figure 10, we can draw the conclusion that Snap and Twitter are probably most similar. Both had a negative net income in the year prior to IPO (Snapchat's net loss: $515m on revenues of $404m), while Facebook and Google always were hugely profitable companies with a very high net income.

Even LinkedIn, even though it was smaller, already turned a positive EBIT margin in contrast to Snap.

Figure 10: Snap vs Competitors at their IPOs

Performance at IPO					
	Snap	**Facebook**	**Twitter**	**LinkedIn**	**Google**
Financial Performance					
Revenues	$944	$5.089	$665	$522	$3.169
EBIT	-$706	$538	-$636	$26	$853
EBIT Margin	*-75%*	*11%*	*-96%*	*5%*	*27%*
Operating Performance					
DAU	158	526	100	-	-
Q-to-Q Growth	*3,3%*	*8,9%*	*6,40%*	-	-
Minutes/Day	25	50	2	-	50
Market data					
Price-to-Sales	58,3	28	44,8	-	16

Data source: Personal Elaboration (numbers in million)

If Snap wanted to be able to generate positive income in the future, it should increase its ad load, which was remarkably lower than its competitors. Furthermore, Snap also generated substantially lower revenues than Facebook and Google, which shows that Snap was not as mature as these two giants, even though its goal was to pitch itself as the 'next Facebook'. In contrast, Snap's revenues were greater than those of LinkedIn and Twitter.

Furthermore, it seems that Snap's operating performance, and more specific its active user base, could use some improvement at the date of IPO. The DAU of Facebook was substantially higher than the one of Snapchat: at the time of Facebook's IPO, the social media giant achieved a DAU of 526million (while Snapchat had a DAU of 158 million). In 2016, the active users base of Facebook reached the number of 1.23billion. However, Snap exceeded the DAU of his other direct competitor, Twitter, with more than 58% at the time of its IPO.

The competitive pressure was strongly affecting Snap's growth of consumer base, which was – as mentioned above - 158 million DAU at the time of the IPO, but gradually appeared to be slowing. Compared to Facebook and Twitter at their IPO dates, Snap's DAU had a remarkably small growth rate of only 3,3%. The biggest direct challenger to Snapchat became Instagram - owned by Facebook - when the latter launched the Stories function and gained 150 million daily active users, on its way to surpass Snapchat before the end of that year. At that moment, Snapchat's growth slowed by 82%. At last, the high price-to-sales multiple of Snap (being 58.3) under the assumption of the $17 issue price was out of range in comparison to other technology companies at the time of

their IPOs. Again, Twitter appeared to be the closest to Snapchat with a price-to-sales multiple of 44.8.

3.1.2 Key challenges and opportunities

Snap's first opportunities came from the market. Firstly, the economy was starting to do better. As a result, the Federal Bank of America increased the interest rate to slow down growth and control inflation. Furthermore, there was less uncertainty around Donald Trump's policies and this was calming down the markets.

Second, the mobile ads market was growing fast, substituting conventional advertising.

Figure 11: Global advertising from 2011 to 2019
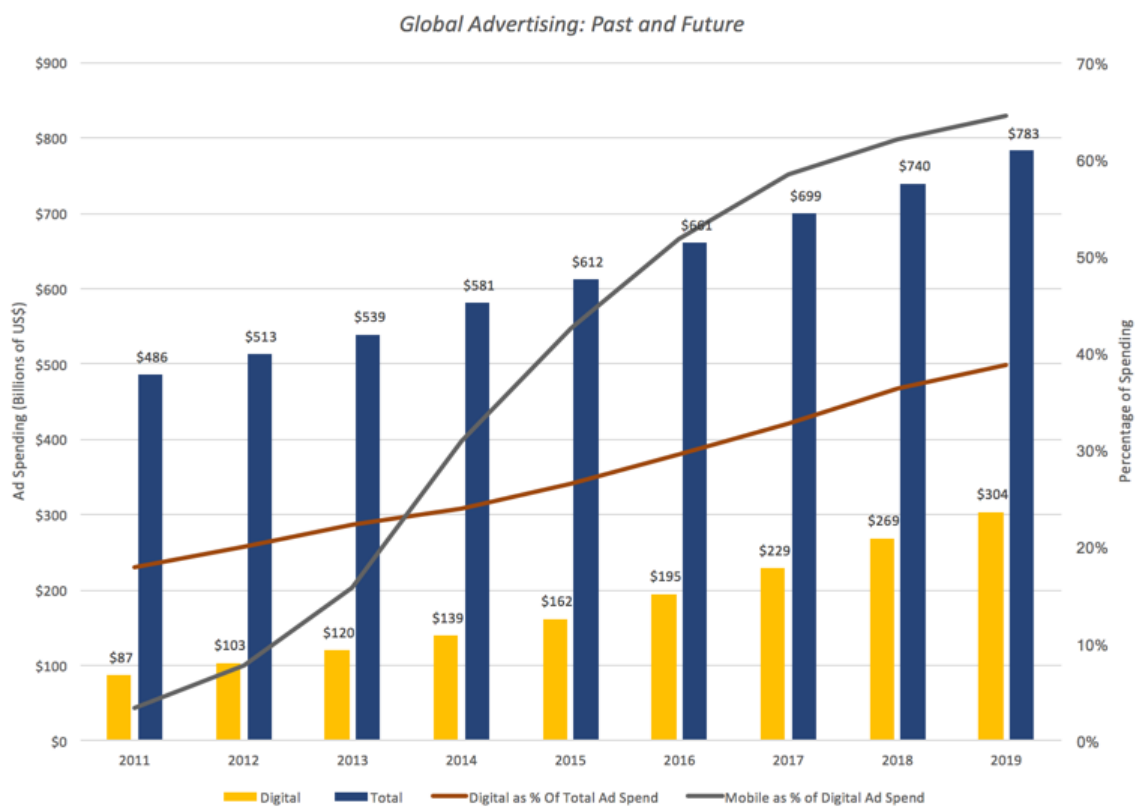
Source: Aswath Damodaran, "My Snap Story: Valuing Snap ahead of its IPO!", 2017

As shown in Figure 11, in 2016 digital ad had revenues for almost $200B, more than doubled from 2012, and expected to grow to more than $300B by 2020. Mobile advertising was expected the one with the most growth, starting from less than 5% of digital ads in 2011 to be half of it by 2020 and expecting to generate revenues for about $200B (25% of total ad market of 2020).

This increase in demand could lead to two things. The first one is an increase in ad's prices since competition among companies to buy ads will grow. The second one is regarding the size of the market. This means that even if the competition among companies such as Facebook and Twitter

is strong, there will still be room for Snap to get a share of this market. Finally, the demand for communication platforms like Snapchat has increased and this represented a good opportunity to significantly increase the number of users and at the same time increase the revenues. In addition, Snap was trying to diversify itself by placing different products on the market such as the Spectacles.

The second set of opportunities concerned the financial market. Even though the Fed was slightly increasing the interest rate, the cost of debt remained substantially low. As a result, a lot of private companies were turning to bank's loans in order to get financed. Furthermore, Tech companies were staying private longer and they were often bought out before even going public. Hence, few companies were going public, as seen in Figure 9, and this was driving up investors' appetite for tech companies. So, with so little ''supply'' of tech companies in the public market and growing interest of investors for them, Snap seemed to be well-positioned for raising funds once listed.

Nevertheless, even if there were tremendous opportunities for Snap Inc, challenges remained numerous, starting from revenues. In the before the IPO, Snap experienced huge growth in revenues. However, they were unable to translate this growth into profits yet. Part of it was because they were ''burning cash'' by investing in research and development. Snap would need to find a good balance between investments and liquidity. On the same level, thanks to the inability to monetize its users. Snap had the lowest average revenue per user among all companies. Additionally, even though Snap was trying to diversify itself and pretended to be more than just one app, the truth is that Snapchat was its major source of revenue. This last point leads us to competitors. Snap's was facing strong competitors, Instagram on all. After having their offer rejected by Spiegel, Facebook decided to develop similar products to Snapchat, representing a real threat. This, coupled with the fact that millennials, Snapchat's main users, lacked brand loyalty, brings up a lot of uncertainty regarding the app's future. Instagram, backed by Facebook, was Snapchat's biggest challenge and in order to be the leader in the market, they needed to make more efforts to attracts new users. Also, since Snapchat was the main revenue generator for Snap Inc, they would have also needed to make more efforts to diversify them.

Another challenge that Snap was facing was attracting talents. As said previously, the American economy was recovering. In fact, it has reached the lowest unemployment rate since "The Glorious Thirty'' years. With the technology sector growing rapidly and low unemployment rate, talents were rare, and Snap had to compete with giants like Google, Facebook or Amazon, who offered exceptional working conditions and high salaries. Furthermore, Snap was dependent on Google's Cloud technology and Amazon's web services. In fact, they had signed long term contracts with both. Finally, the last challenge concerned the structure of the company. The founders had full control of the company since they were about to offer only non-voting shares on the public market.

This offering would represent the first time in the history of the market exchange that a company attempted an IPO trying to place solely non-voting share. The idea of investing money without being able to say something was raising doubts in investors. Ken Bertsch, executive director of the Council of Institutional Investors, said that Snap should not have been allowed to list on any exchange market because it basically had access public equity funds without voting strings and keeping to operate like a private company.

3.2 Snap's target price

On March 2, 2017, Snap got listed on the NYSE. The underwriters chose a target price of $17 per share, but, thanks to the hype around the company, the stock opened at a price of $24 per share, 41% higher. The first impression was that Snap had been underpriced, leaving a lot of money on the table.

Some analysts started to raise some doubts about the numbers did not add up and started to rate the stock as a "Sell". Meanwhile, after a couple of weeks from the IPO Morgan Stanley, one of the underwriters released a note saying that they had overstated the forecasted earnings by $5B over 5 years[34]. Their review included also a correction of the WACC used and this measure allowed to leave the target price unchanged. However, reporters noted that the WACC used by the Morgan Stanley's analyst was lower than the one given to Facebook, that was making $10,2B of net income, in contrast with Snap's lack of profit.

This set an example of how valuations, even from analysts that move the market, are highly affected by subjective opinions and assumptions of the single analysts.

The report will now evaluate the company using the Discounted Cash Flow, in order to find the target price of Snap in the period before the IPO. The forecasted period is ten years to overcome the losses of the first years and reduce the impact of the Terminal Value.

3.2.1 Forecasted Revenues

The primary, if not the only, source of revenues is represented by the sale of advertising products. As already introduced, the global ad market was growing, thanks to the outbreak of digital and mobile advertising boosted by the rise of social media. As it is possible to see in Figure 12, the revenues had a huge increase of 509% from 2015 to 2016 going from $58,7 million to $404,5 million. The slower increase of costs of revenues led to a higher gross profit. However, the

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[34] Matt Turner and Rachael Levy, "Morgan Stanley made an error analyzing Snapchat, and it shines a light on some big flaws in Wall Street research," *Business Insider*, April 4, 2017

investments made on "Spectacles" and the growth of the app has dragged down the EBIT to a negative $520,4m.

Figure 11: Income Statement

($ million)	2016	2015
Revenues	404,5	58,7
Cost of revenues	(451,7)	(182,3)
GROSS PROFIT	**(47,2)**	**(123,7)**
SG&A	(289,5)	(175,8)
R&D	(183,7)	(82,2)
OPERATING EXPENSES	(473,2)	(258,1)
EBIT	**(520,4)**	**(381,7)**
Interest income	4,7	1,4
Interest expense	(1,4)	0,0
Other income (expense), net	(4,6)	(0,2)
FINANCIAL EXPENSES	(1,3)	1,2
EBT	**(521,7)**	**(380,5)**
Income tax benefit (expense)	(7,1)	(7,6)
NET INCOME(LOSS)	**(514,6)**	**(372,9)**

Data source: Snap, Inc. February 2, 2017 Form S-1 (filed February 2, 2017)

The company has closed the financial year with a huge loss of $514,6 million, worsening the result of previous year. So, the question to answer was about if and when the company would have turned profitable. The report will try to answer it.

To forecast the FCFs of Snap, it is necessary to first get a reasonable estimate of future revenues. As the main source of revenue for Snap is advertising, the best starting point is to consider the underlying forces behind changes in revenue, which are DAU[35] and ARPU[36]. The number of users was following a positive trend, as it is possible to see in Figure 13, representing quarterly average daily active users. During 2016, North America has pulled the growth of the user base, leading to DAU of 158 million in the last quarter, 68 of which from North America.

The growth of the second half of the year depended on the launch of new features and products on Snapchat and the increased user engagement on terms of users' age and geographic expansion.

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[35] DAU: Daily Active Users
[36] ARPU: Average Revenues per User

Figure 12: Snap's Quarterly Average DAU
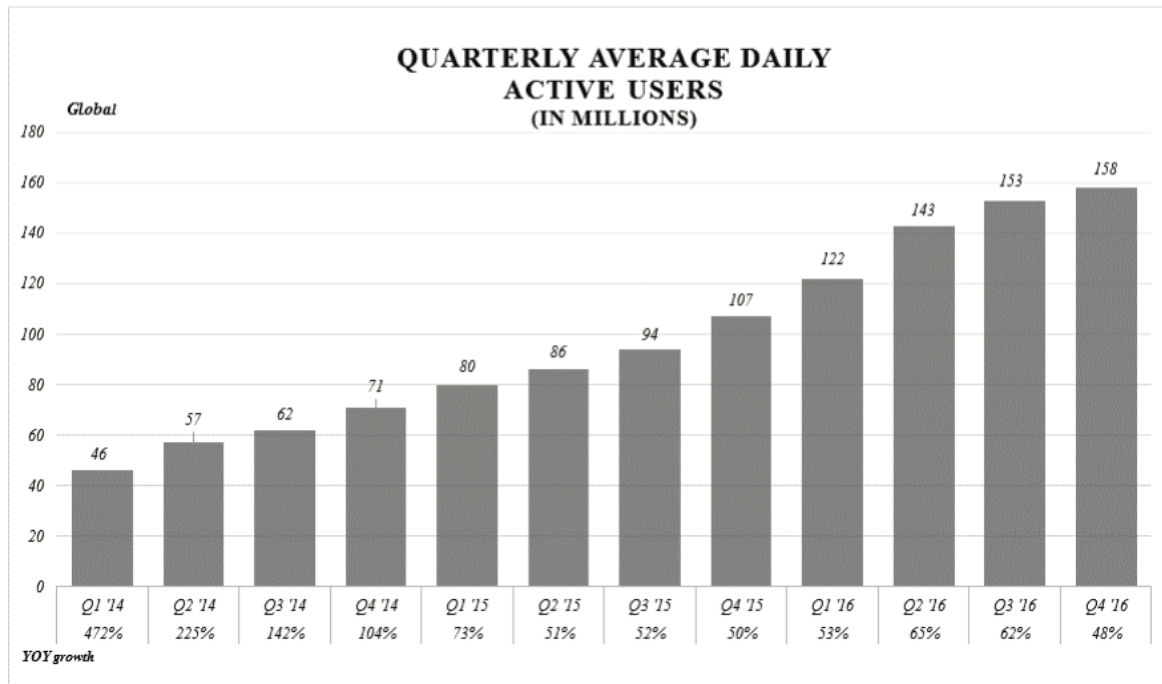
Data source: Snap, Inc. February 2, 2017 Form S-1 (filed February 2, 2017)

Despite this excellent numbers, we assumed that the growth rate will drastically slow down (-50%) continuing the trend of the previous quarters as a result of the immediate competitive threat presented by Instagram launching a similar story function as Snap. Because of the stated expectation that Instagram will surpass Snap in terms of DAU by the end of 2017 as a consequence of the new story function, the growth will still decrease between 2018-2020 but to a smaller extent as most users that prefer Instagram over Snap would switch the platform and, thus, Snap's user base slowly stabilizes to a constant growth rate of 12%. We believe that Snap is able to maintain this DAU growth due to its already proven innovation power, the specific focus on young customers offering significant penetration potential and the general boom in the mobile advertisement market.

Given the user base, it is now the time to monetize it. Snap's monetization process is still in an early stage, but they are investing resources to improve it.

So, following the DAU estimation, we continue by forecasting ad revenues. The post IPO performance metrics of Snap's close competitors (Google, Facebook, Twitter, and LinkedIn) shown in Figure 13 below, provides the basis for our estimation. Retrieving the median growth rates of the peers' revenues following their IPOs seemed to be a plausible orientation for Snap's future development. However, given the larger user base and the established market reputation of the mentioned competitors as well as due to certain risk factors involved in Snap's further development, we adjusted Snap's growth rates slightly downwards.

	Google		LinkedIn		Facebook		Twitter		Mean Growth	Median Growth	Adj. Growth Snap
	Revenues	%Growth	Revenues	%Growth	Revenues	%Growth	Revenues	%Growth			
IPO Year	$3.169		$522		$5.089		$665				
1	$6.139	94%	$972	86%	$7.872	55%	$1.403	111%	86,40%	89,96%	77%
2	$10.605	73%	$1.529	57%	$12.466	58%	$2.218	58%	61,63%	58,22%	46%
3	$16.594	56%	$2.219	45%	$17.928	44%	$2.530	14%	39,87%	44,47%	32%
4	-	31,35%	-	34,79%	-	54,16%	-	-	40,10%	34,79%	25%
5-10	-	24,81%	-	-	-	-	-	-	24,81%	24,81%	20%

Data source: Personal elaboration of data from: Aswath Damodaran, "My Snap Story: Valuing Snap ahead of its IPO!", 2017 (numbers in million)

Retrieving the ARPU by assuming that all revenues of Snap come from advertising, we reach a quite aggressive forecast compared to Snap's peers. However, considering, on the one hand, Snap's plan to increase ad load substantially and on the other hand, inflation that might generally be a driver for higher ARPU's, the forecast seems justifiable. The assumption that all revenues are coming from advertisements must be made due to a lack of information on the size and impact of hardware revenues Snap could be able to generate. While equating Snap's total revenues with its ad revenues is not entirely accurate as they also have minor hardware sales through Spectacles, the product's limited success, as well as its negative prospects projected by analysts, make this approach seem fairly robust. Besides, it is, since we lack detailed information on Spectacles' revenues, the only viable option.

To delve deeper into the source of Snap's revenues, we have broken down ARPU over the planning period into its components (Figure 14). Under the assumption that the hourly usage of each DAU per day remains constant over time, we are left with Ads/DAU/Hour and average pricing as variables. Comparing Snap's pricing to its competitors, it is evident that Snap demands a premium for ads on its app, which might be driven by ad exclusivity due to the low ad load and the coveted young userbase of Snapchat.

Figure 14: Breakdown of Snap's revenues

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	TV	Instagram	Facebook	Twitter
	Act	Act	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Act2016	Act2016	Act2016
DAU	158	196	238	283	327	368	412	461	517	579	648	345	1277	129
Growth in DAU	48%	24%	21%	19%	15%	12%	12%	12%	12%	12%	12%			
Hours p. DAU p. Day	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,36	0,58	0,15
Ads p. DAU p. Hour	0,6	2,06	3,26	4,35	5,47	6,76	8,15	9,97	12,47	16,06	18,63	6,60	48,60	104,30
Average Pricing	$27,8	$25,8	$23,8	$21,8	$19,8	$17,8	$15,8	$13,8	$11,8	$9,8	$7,8	$6,0	$2,0	$3,0
Days per Year	365	365	365	365	365	365	365	365	365	365	365	365	365	365
ARPU	$2,6	$8,2	$11,9	$14,6	$16,6	$18,5	$19,8	$21,2	$22,6	$24,2	$22,4	$5,2	$20,6	$17,1
Growth in ARPU	367%	219%	46%	22%	14%	11%	7%	7%	7%	7%	-8%			
Ad Revenue	$405	$1.596	$2.832	$4.127	$5.447	$6.797	$8.144	$9.757	$11.690	$14.005	$14.495			

Data source: Personal elaboration; competitor's data from: Aswath Damodaran, "My Snap Story: Valuing Snap ahead of its IPO!", 2017 (numbers in million)

While we believe Snap to sustain a premium over its competitors, an increase in the ads per hour, as well as the increased competitive pressure through Instagram, lead us to the assumption that this pricing cannot be sustained. Thus, we assume that average prices will drop by $2 per year, which implies that by 2026, Snap will have reached average pricing of $7,8 compared to Instagram's $6,0. Given future inflation, we find this number to be reasonable due to the growing market and despite increased competition.

Then, based on the estimated ARPU and its other components, we can derive the ad load necessary to hit the defined revenue targets. While the growth rates in ads per DAU per hour seem quite aggressive, a comparison with Snap's competitors shows that the plans are actually modest. Even after our detailed planning period, we reach an ad load of 18.63, which equates to approximately 38% of Facebook's and 18% of Twitter's respective ads per DAU per hour. While our projected revenues seem aggressive on the topline, breaking them down to the specific components shows that they are manageable. If Snap manages to keep its drive, ad revenues will be $14B in 2025 from the $405m of 2016. For the years after 2025, a terminal growth rate of 3,5% have been used in the model, using the US Treasury bonds as a benchmark.

3.2.2 Cost components

Following the revenue forecasting, costs need to be estimated. All the expenses estimation below has been made using Morgan Stanley's assumptions for different reasons.

It is important to mention that Snap's business model leads to operating costs mainly being composed of fixed personnel costs and the contracts stipulated with Google and Amazon for their cloud and web services. That is why the absolute cost forecasts have been used instead of the relative cost/revenue ratios. Consequently, the underlying assumption for the operating cost estimation is that absolute costs are easier to estimate than relative cost relations due to existing personnel contracts and other fixed costs.

Scrolling down the estimation, it has been assumed a constant D&A[37]/revenue ratio of 7% which leads to the EBIT forecast for the planning period that provides the basis for the FCF derivation. Since Snap is currently unlevered, the EBIT equates to the EBT and allows us to calculate the cash payouts under consideration of tax loss carryforward.

Following eq. 2.9, that will be re-written for clarity, the missing components are the change in NWC, capital expenditures and stock-based compensations.

*Free Cash Flow = EBIT * (1 – t) + Depreciation + Amortization – Capital Expenditures - ΔNWC*

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[37] D&A: Depreciations & Amortizations

eq. 2.9

As we believe changes in working capital and capital expenditures to be driven by changes in revenue, the respective revenue ratios have been used to scale Morgan Stanley's forecasts to our revenues.

Figure 14: NWC and CapEx estimations

	2016 Act	2017 Exp	2018 Exp	2019 Exp	2020 Exp	2021 Exp	2022 Exp	2023 Exp	2024 Exp	2025 Exp
Incr/(Decr) in NWC	-151	-434	-333	-292	-254	-206	-198	-208	-171	-127
Delta NWC/Revenue	*-37%*	*-27%*	*-12%*	*-7%*	*-5%*	*-3%*	*-2%*	*-2%*	*-1%*	*-1%*
CapEx	67	140	141	138	133	128	124	124	128	136
Delta CapEx/Revenue	*17%*	*9%*	*5%*	*3%*	*2%*	*2%*	*2%*	*1%*	*1%*	*1%*

Data source: Personal elaboration on Morgan Stanley's assumptions (numbers in million)

The last item is the stock-based compensation. Google recorded an expense of 9% of its revenue while the corresponding figures for Facebook and Twitter were 31% and 90% respectively[38]. This illustrates Snap's quick head-count development in relation to topline growth and profitability as Snap to a larger degree must rely on stock-based compensation to attract talented people rather than offering higher salaries. This further illustrates the difficulty in finding a proper proxy for this item, as well as the sensitivity of forecasted cash flow. For this reason, Morgan Stanley's assumptions have been used again.

Together with forecasted revenues, these assumptions have led to the estimation of FCF:

Figure 15: FCF Estimation

	2016 Act	2017 Act	2018 Exp	2019 Exp	2020 Exp	2021 Exp	2022 Exp	2023 Exp	2024 Exp	2025 Exp	TV Exp
Net Revenue	$405	$1.596	$2.832	$4.127	$5.447	$6.797	$8.144	$9.757	$11.690	$14.005	$14.495
Operating Costs	$864	$1.716	$2.544	$3.449	$4.539	$5.433	$6.572	$7.748	$8.908	$9.995	$10.345
EBITDA	-$459	-$120	$288	$679	$908	$1.364	$1.571	$2.009	$2.781	$4.010	$4.150
D&A	$28	$112	$198	$289	$381	$476	$570	$683	$818	$980	
EBIT	-$488	-$231	$90	$390	$526	$888	$1.001	$1.326	$1.963	$3.030	
D&A	$28	$112	$198	$289	$381	$476	$570	$683	$818	$980	
Cash Taxes	$0	$0	$0	$0	$86	$266	$300	$398	$589	$909	
Change in NWC	$151	$434	$333	$292	$254	$206	$198	$208	$171	$127	
CapEx	$67	$140	$141	$138	$133	$128	$124	$124	$128	$136	
Stock-based Comp.	$32	$75	$159	$203	$257	$317	$421	$533	$648	$759	
FCF	-$709	-$768	-$346	$45	$178	$447	$527	$746	$1.245	$2.078	$2.151

Source: Personal elaboration (numbers in million)

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[38] Data source: Macrotrends.net

3.2.3 WACC Estimation

The WACC is a function of all financing instruments of a company, their respective share in total capital and appropriate individual costs of capital. As described in chapter 2, we use the WACC as the discount factor of the free cash flows. In order to compute it, we need the cost of equity, the cost of debt and the financial structure (eq. 2.11).

Snap has a positive net financial position and 0% leverage, then the WACC equals the equity costs of capital, as equity is the only source of funding. Therefore, we refer to the Capital Asset Pricing Model to determine an appropriate discount rate for Snap.

Following the CAPM, Snap's cost of equity should consist of a market-wide risk-free rate and a risk premium, which is the product of the market risk premium and Snap's beta. For the risk-free rate, we deem the 10-year treasury yield of 2.38% to be the most appropriate choice, as 10 years might match the duration of an investment in Snap more closely than longer periods. For the market risk premium, we compute the daily returns of the S&P 500-index in the three most recent years before the IPO to arrive at an average market return of 9.41%, implying a risk premium of 7.03%. We choose three years as using a longer timeframe would distort the market return through extraordinary returns in single years. With the chosen period under consideration, we reach a market risk premium closely in line with the recommended range of 6% to 7%.

Then, the central task of finding a beta that appropriately represents the business risk inherent to Snap remains. Since Snap, logically, was a private company before its IPO, no previous stock returns are available to immediately compute beta. Therefore, we have to refer to a peer group of companies operating in the same field of business being subject to the same systematic risk. To that end, we primarily refer to companies operating in the same industry as Snap. Here, Facebook and Twitter are the most natural choices as both are social media platforms that monetize ads. As these two companies are Snap's immediate competitors, they must be included in any peer group on Snap. Additionally, we propose to include Google as well, even though the business model differs from the social media platforms discussed before. The reasoning behind this choice is twofold: firstly, Google owns YouTube, which is another key competitor of Snap, and secondly, Google is the key player in the global digital ad market, through which Snap aims to monetize. While their respective roles in the mobile ad market might differ, the revenue of both Google and Snap is largely dependent on it, implying similar systematic risks. Other potentially appropriate peers like the social media platforms LinkedIn cannot be included as it is not listed. Thus, in a first step, we will consider this peer group.

The Refinitiv Eikon platform (ex Thomson Reuters) provides the 5-year beta for these companies as well as their respective leverage ratios. Thus, unlevering them allows to find their respective business risks without the influence of the respective capital structure. Aggregating these values

allows to find an average beta of 0.84 and a median beta of 0.88. Since we assume Snap to be unlevered, a relevering is unnecessary. However, we do not find these values appropriate for several reasons. Firstly, the peer group consists of two of the worlds' largest corporations several times larger than Snap, which, if we follow the logic from Fama and French, should make Snap comparably riskier. Secondly, we believe that a beta below 1, which implies less risk than the full market, is questionable given Snap's lack of profitability. Lastly, we find a 5- year beta for these companies to be too long due to recent developments in the world of online platforms. While the full-on Facebook-Cambridge Analytica data scandal only emerged after Snap's IPO, first reports about questionable business practices regarding data protection were published starting from December 2015. As a result, increased uncertainty and talk about additional regulation severely impacted the industry risk in online businesses.

For these reasons, two adjustments have been made to the peer group presented in the case. To capture market sentiment, we use a 3-year timeframe for the beta estimation as it will be more affected by recent industry trends. Moreover, Yelp is added to the peer group as its revenue model is similar to the other comparables and it is substantially smaller, counteracting the effect of including Facebook and Google.

Figure 16: Beta estimation

	3 Year Beta	Leverage Ratio	Unlevered Betas
Google (Alphabet)	1,07	2,75%	1,05
Facebook	1,18	0,00%	1,18
Twitter	1,08	26,81%	0,91
Yelp	1,51	0,00%	1,51
Average	**1,21**	**7,39%**	**1,16**
Median	1,13	1,38%	1,12

Source: Personal elaboration on data from Refinitiv Eikon

Then, after unlevering the respective betas computed with the S&P-500 as a market proxy, we find an average beta of 1.16. Interestingly, this value is extremely close to the beta of 1.17 proposed by Aswath Damodaran for Snap at its IPO. Using all inputs discussed before in detail, the equity cost of capital and so the WACC is estimated at 10.56%.

3.2.4 Was it right?

After having defined all the components of the DCF model, it is possible to estimate the enterprise value of Snap.

Figure 17: Snap DCF Model (numbers in million)

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	TV
	Act	Act	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp	Exp
Net Revenue	$405	$1.596	$2.832	$4.127	$5.447	$6.797	$8.144	$9.757	$11.690	$14.005	$14.495
Operating Costs	$864	$1.716	$2.544	$3.449	$4.539	$5.433	$6.572	$7.748	$8.908	$9.995	$10.345
EBITDA	-$459	-$120	$288	$679	$908	$1.364	$1.571	$2.009	$2.781	$4.010	$4.150
D&A	$28	$112	$198	$289	$381	$476	$570	$683	$818	$980	
EBIT	-$488	-$231	$90	$390	$526	$888	$1.001	$1.326	$1.963	$3.030	
D&A	$28	$112	$198	$289	$381	$476	$570	$683	$818	$980	
Cash Taxes	$0	$0	$0	$0	$86	$266	$300	$398	$589	$909	
Change in NWC	$151	$434	$333	$292	$254	$206	$198	$208	$171	$127	
CapEx	$67	$140	$141	$138	$133	$128	$124	$124	$128	$136	
Stock-based Comp.	$32	$75	$159	$203	$257	$317	$421	$533	$648	$759	
FCF	-$709	-$768	-$346	$45	$178	$447	$527	$746	$1.245	$2.078	$2.151
TV											$30.452
Enterprise Value	$16.067										

The sum of the present values of FCF corresponds to an enterprise value of $16B.

By adding up the excess cash and subtracting the debt (none in this case), it is possible to get the equity value, that, divided by the number shares outstanding give the share price of $14,45.

Figure 18: Snap share price (numbers in million)

# Fully Diluted Shares	1.180
Enterprise Value	$16.067,1
Excess Cash	$987,4
Equity Value	$17.054,4
Share Price	$14,45

As already pointed out in previous sections, the DCF valuation is based on many assumptions that involve risk factors that could have a tremendous impact not only on the WACC but also on future growth and thus on the terminal growth rate. While this model delivers an equity value of $17,05B, which implies a share price of $14,45, it is important to conduct a sensitivity analysis on these values. Using a reasonable range of optimistic and pessimistic values for WACC and TV growth rate, it is possible to derive derive a large range of share prices presented in Figure 19. The values highlighted in grey are in the most realistic range.

Figure 19: Share price sensitivity analysis regarding WACC and TV growth rate

				WACC			
		9,0%	9,5%	10,0%	10,6%	11,0%	11,5%	12,0%
TV Growth Rate	2,0%	$15,99	$14,63	$13,45	$12,29	$11,50	$10,69	$9,97
	2,5%	$17,05	$15,52	$14,20	$12,92	$12,06	$11,17	$10,39
	3,0%	$18,29	$16,54	$15,06	$13,64	$12,68	$11,71	$10,86
	3,5%	$19,75	$17,74	$16,05	$14,45	$13,39	$12,31	$11,38
	4,0%	$21,50	$19,15	$17,21	$15,39	$14,19	$13,00	$11,96
	4,5%	$23,64	$20,85	$18,58	$16,49	$15,13	$13,78	$12,63
	5,0%	$26,32	$22,92	$20,23	$17,78	$16,21	$14,69	$13,39

As already pointed out earlier, many factors have a huge impact on WACC but are hard to determine reliably. The same holds for the terminal growth rate, which is difficult to estimate for a company as young as Snap Inc. having inherent business risk in a highly dynamic, competitive market. However, as it is a major driver in the model and, therefore, has a significant effect on the resulting equity value and share price, it needs to be assessed carefully.

The major driver of future growth and thus of the terminal growth rate are revenues, which are in the case of Snap Inc. a function of DAU and ARPU as assessed before. Therefore, future growth either results from an increasing number of DAU or of ARPU coming from an increase in hours per DAU, the number of ads per DAU or the respective ad pricing. Looking at Snap's DAU in comparison to Facebook and Twitter, the position seems quite reasonable as Snap already outpaced Twitter and given the past growth rates a further positive development seems to be a reasonable assumption. In terms of user minutes per day, Snap demonstrates a really strong position compared to Google and Facebook who are established strong players in the market but only have 50% more user minutes per day. The future growth assumption is further supported by the development of the mobile advertisement segment that experiences a boom time and is expected to further grow internationally in the coming years presenting the perfect basis for Snap's future development as it offers significant revenue potential. As well, Snap's main focus in terms of target group lies on Millennial users that are hard to reach by the major competitors. Because this target group still offers a huge penetration potential, these aspects present an important competitive advantage for Snap and, thus, a possible source for further growth. Furthermore, the business model offers good scalability potential as already was demonstrated by Snap increasing its revenues by 600% while increasing losses only by 38% at the same time. Also, the creativity and innovative power that Snap has demonstrated so far in product launches and product addons is promising a good competitive position in the future.

Whereas all these mentioned aspects seem to justify a high terminal growth rate, we also need to consider some possible risk factors that could harm Snap's future position and have the potential

to drive down the share price. First of all, Snap's ARPU is still comparatively low compared to strong competitors like Facebook (Figure 14) and the DAU growth rate already slows down, which makes it difficult to catch up with competitors if that trend continues. To stay competitive, Snap needs to maintain and increase advertiser spend significantly as it presents the core revenue source and the ad load currently is low compared to the competitors. The competitive threat additionally becomes more severe as for instance, Instagram is launching features that are similar to Snap's core services such as Stories. This could lead customers to switch from Snap to Instagram out of convenience motives as everything would be integrated into one platform. This, however, would significantly harm Snap's DAU rate and thus has an impact on further revenue growth. The threat is further supported by the young target group that lacks brand and app loyalty.

Besides, Snap is highly dependent on its suppliers for computing services and has large commitments with Google Could and Amazon Webservices. Finally, not only the untested management but also the lack of a centralized headquarter and a negatively perceived company culture make it hard to attract new talents in such a competitive market which presents a major challenge in terms of scaling up the company. Additionally, the absence of voting rights for shareholders is a possible source for risk as the co-founders exercise significant control over the company limiting the decision power of investors.

In the end, many different aspects could either support or harm future growth which is the reason why a TV growth rate of 3.5% is a good compromise being neither too optimistic nor too pessimistic about Snap's future giving a robust average growth rate of future cash flows.

Moreover, to account for uncertainty regarding the FCF, we also conducted a sensitivity analysis on how adding a constant growth rate on our DAU and ARPU estimates would change the share price of Snap. Due to the dynamic impact of adding a growth rate each year, even small changes can strongly influence the target price of $14,45 as Figure 20 illustrates.

Figure 20: Share price sensitivity analysis regarding WACC and TV growth rate

		DAU						
		-3%	-2%	-1%	0%	1%	2%	3%
ARPU	-3%	$8,00	$9,06	$10,12	$11,18	$12,24	$13,30	$14,35
	-2%	$9,06	$10,13	$11,20	$12,27	$13,34	$14,41	$15,48
	-1%	$10,12	$11,20	$12,28	$13,36	$14,44	$15,52	$16,60
	0%	$11,18	$12,27	$13,36	$14,45	$15,54	$16,64	$17,73
	1%	$12,24	$13,34	$14,44	$15,54	$16,65	$17,75	$18,85
	2%	$13,30	$14,41	$15,52	$16,64	$17,75	$18,86	$19,97
	3%	$14,35	$15,48	$16,60	$17,73	$18,85	$19,97	$21,10

Choosing more pessimistic assumptions regarding the revenue components will clearly lead to a plummeting of the share price, while the opposite holds for optimistic assumptions.

In conclusion, this valuation model leads to believe that a share price of $14,5 is reasonable. Nonetheless, this value has been reached under assumptions that could partly be considered as aggressive and are without any doubt subject to many uncertainties. Thus, the two sensitivity analyses need to be highlighted, because both underline that slight changes of input might have major impacts on the suitable target price.

3.3 What happened next

As already described, Snap went public on March 2, 2017 and represented the biggest U.S. tech IPO in years. During the first day, the title soared 44% closing at a price of $24,48.

Less than a week on the public market and the stock was already down almost 15%, as investors' hype was vanishing. Snap's price started to go up and down but keeping a negative trend during the next months. The Wall Street Journal pointed out 6 key moments of the first 9 months. Figure 21 shows the trend between the first trading day record (point 1) until the report of third quarter.

Figure 21: Snap's stock price fall

Source: C. Driebusch, M. Farrell and G. Wells, "Snap's Rise and Fall: How a Big, Splashy IPO Prompted the Doubters to Keep Mum", Wall Street Journal

The second big drop happened after the announcement of the 1Q report, showing a slower user growth than expected. The drop kept going until, on 10 of July, the price went below the IPO price for the first time (point 3). Since that moment, the stock went above it just in a few moments for the next 3 years. During the first 9 months, the share price went close to $10 after Q2 and Q3 reports, showing weak revenues and a slow growth (point 5 and 6).

The problem was that investors had started to see at the reality in an objective way, realizing that the lack of profits and the competitive battle with Instagram were stronger than Snap's popularity and attractiveness.

The next three years saw the title plummeting, reaching an all-time low at $ 4,8 in December 2018. That year closed with a -55% YoY as losses started to be a routine and after having the first drop ever of DAU. Snap was clearly felling the pressure of Instagram's competition, which launched a series of features quite similar, if not the same, of Snapchat. Even the economic environment did not help, due to fears over an increase of interest rates and the shadow of a trade war between USA and China.

As it is possible to see from Figure 22, we have to wait until the first half of 2020 to see an increase of the stock price. The year began with the news of Corona virus in China. Soon, it started to spread all over the world, causing massive lockdowns everywhere. People were forced to stay at home in order to help containing the virus. These measures pushed all social media companies as people were seeking all forms of entertaining and of communications to keep in touch with family and friends. Therefore, Snap's user base jumped and started to grow exponentially.

During the second half of the year, the spread of a second wave of infections pushed the company's user's growth, revenues and profits marking an incredible Q4 results, above analysts' expectations. 2021 has started with a lot of enthusiasm about the nearest future, as the stock is trading at around $60 per share.

Figure 22: Snap's stock price development
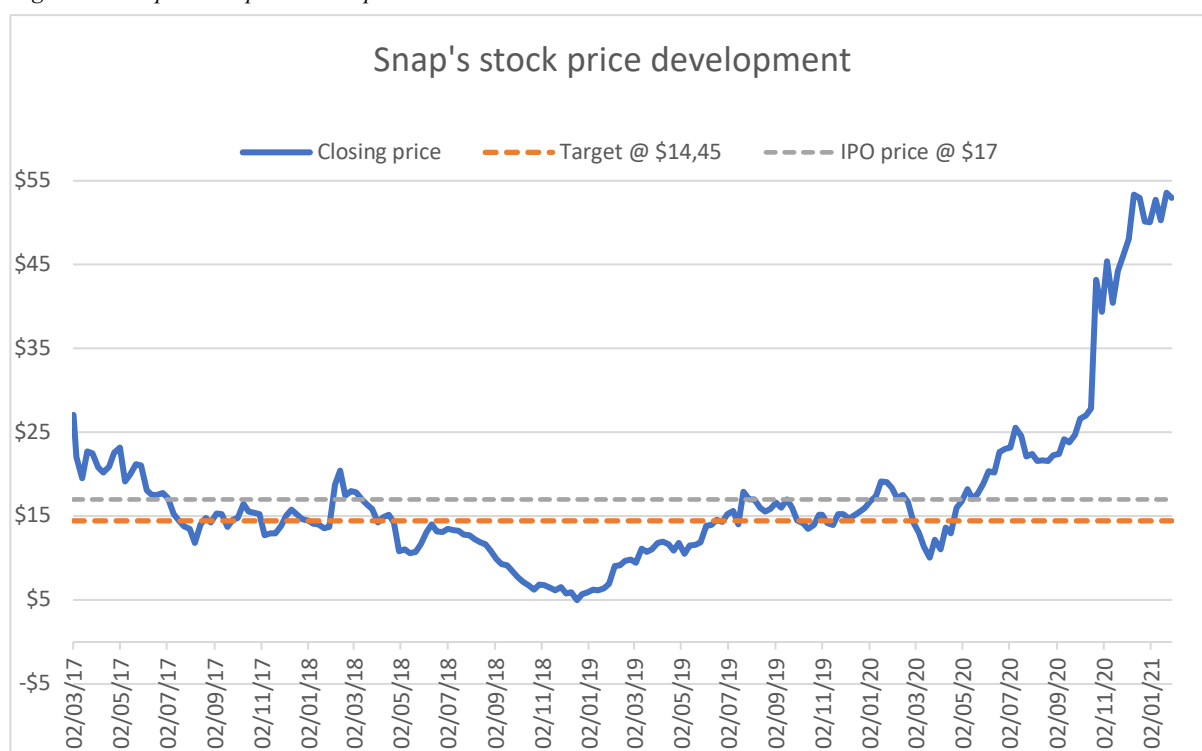
Data source: Refinitiv Eikon

Despite all this, it is interesting to notice that Snap is not able to generate profit yet: current projections see the EBITDA reaching a loss of $50/$70 million.

Snap has been inevitably benefited from the global pandemic, but it is unknown what there will be waiting for the company in the future. Will it keep growing and meeting investors' expectations or it will fall again once the pandemic has passed?

Conclusions

The economic environment of the last 10 years has set the path for a valuations' inflation on the private market. Tech start-ups are getting valued billions of dollars even after a couple of years from birth, with investors betting on ideas and potential to find the next big company. Snap, for example, took less than two years to reach $1B valuation and entering the Unicorn club.

As described in previous sections, there are many reasons behind this phenomenon. The market opportunities left behind by the advent of internet and the dot-com bubble have been chased by tech start-ups in order to disrupt their industries with new ideas and technologies.

While these companies were riding the digital transformation wave, investors, especially venture capital, started to chase potential Unicorns to fund. Recalling Figure 7 ("Total private funding from 2001 to 2020"), private funding volume has exponentially increased in the last 20 years, reaching new highs every year, with 2020 record of $130B. The direct consequence of this huge amount of cash in the market is represented by company's valuations. As of January 2021, the 528 Unicorns reached an aggregate value of $1.817B. The private market is clearly full of financing possibilities for start-ups, who does not have to go public to raise funds for the growth. Still, during 2018 and 2019, a high number of the highest valued Unicorns has decided to go public. The main reason behind it is the pressure from VCs to exit their investment and make huge returns. And as a lot of attention has been caught by Unicorns, they could have missed the moment of riding a bull market before the burst of a bubble.

The report has analyzed the case of Snap Inc., parent company of Snapchat, that has reached a valuation of $20B before deciding to go public, even with a negative profitability and doubtful expectations of growth. The aim of the analysis was to identify the real value of the company at the time of the IPO, in order to assess the target price and compare it with the one with which it got listed. Since its foundation, Snap has gone through seven funding series raising more than $2,5B in 5 years, from private investors led by VCs Kleiner Perkins, Lightspeed Venture Partners and Benchmark. On March 2, 2017, Snap got listed on the NYSE with a share price of $17 and a total valuation of $23,6B. The hype around this IPO, which represented the highest tech IPO since Facebook, was so high that on the first day of trading the stock closed with a +44%. But that was it, and the price started to fall until 2020.

The analysis carried out highlighted that the assumptions made by the underwriters of the IPO were too optimistic. Due to a high competition with Instagram and a "trade war" to get ad market shares, the growth in revenues was not that easy. The review of the assumptions made by Morgan Stanley, one of the underwriters, our analysis has shown a slower growth rate both on Snap's user base and on its ability of turning into a profit. The equity value estimated was $17.054B with a share price

of $14,45, 15% lower than the actual IPO price. The report can affirm that, according to the analysis carried out, Snap was overvalued. The public market realized the same during the first week of trading, as evidence of slower growth rates started to show. The Snap case has set the base for the overvaluation theory behind this report.

The assumptions made on the private market are quite different with the public one, as investors in the stock market are focused on short-term figures, profitability and the corporate structure. Evan Spiegel, Snap's co-founder and CEO, a few months after the IPO acknowledged that they had misjudged some assumptions about the market and that they underestimated how important is the communication on the public market as you need to explain how the business works to a huge investor base. But Snap is not a stand-alone case. During the years after 2017, many other Unicorns were "slaughtered" as entered the public market. The most famous are Uber, Lyft, Slack and the We Company, even if the latter did not even manage to get listed and withdrew the offering. All these Unicorns have in common the billions of dollars raised privately since early years and huge fall once listed on the stock exchange market. Uber got listed with a share price of $45, opened trading at $41,57, with an average price of $35,6 after a year. Lyft, priced its shares at $72 each, closed its first day at $78 and by the end of the year it lost 44% of its value258. Slack debuted with an IPO price of $39, it closed day one at $38.6 but then lost 42% of the value by the end of 2019. Then, The We Company, known as WeWork, got under public scrutiny after having filed for IPO with a valuation of $47B. Analysts reviewed the valuation to $10B after discovering weak financial statements and governance and the company decided to withdraw the offering.

W. Gornall and I.A. Strebulaev made a report[39] developing an adjusted model for Unicorn valuation and found out that, the average start-up examined was overvalued by 48%, with the ten most overvalued companies overvalued by 145%. These cases raise some doubts about private value assessments and what emerge from the analysis is a bubble. The definition of bubble is not clear and not everybody sees it the same way. The 2013 Economics Nobel Prize Robert Shiller defined a speculative bubble as:

> *"A situation in which news of price increases spurs investor enthusiasm which spreads by psychological contagion from person to person, in the process amplifying stories that might justify the price increase and bringing in a larger and larger class of investors, who, despite doubts about the real value of the investment, are drawn to it partly through envy of others' successes and partly through a gambler's excitement"[40]*

[39] W. Gornall, I.A. Strebulaev, "Squaring Venture Capital Valuations with reality", National Bureau of Economic Research, 2020

[40] R. J. Shiller, "Irrational Exuberance: (Second Edition)", Princeton; Oxford: Princeton University Press, 2005

Thus, does that mean that private investors are irrational? Not necessarily.

As already stated, VCs are in search of high returns investment. Tech start-ups are going through more and more funding rounds, and later-stage investors often force to put some protective clauses to hedge potential losses. Example of clauses can be:

- Investors get extra shares if the IPO price is lower than the price paid
- The right to pull out of the IPO if the public valuation is lower than private's
- Liquidation preferences: the investor gets its money back first in case of the company's liquidation

The most aggressive later-stage investor is SoftBank's $100B Vision Fund, which is focused on emerging technologies companies. It is by far the biggest investment fund and their strategy is to invest a minimum of $100 million in companies that seem ready for the market. Vision Fund is responsible for many huge private valuations, which strengthen what said above about start-ups overvaluation. Examples of huge investments are $10,5B funding in Didi Chuxing, currently second most valued Unicorn, $8,7B in WeWork and $8,3 in Uber, and we know how it went with these two companies.

The on-going global pandemic has signed a definitive consecration of the digital transformation, as people around the world are forced to online tools. A line has been drawn between "inside" and "outside" companies[41]. The former, like Snap, are experiencing growth in revenues, users and profits, while the latter are struggling. The same distinction can be made for Unicorns and it can be outline what will happen in the nearest future. "Inside" companies will be preferred by investors and the amount of private funding will not decrease, as seen in the record reached in 2020.

Recalling Shiller's definition of bubble, it is possible to say that investors will still invest "emotionally" for the foreseeable future.

However, the average stock market return of the last 10 years and the record signed in 2020 should be a wake-up call. Given the fact that, due to social psychology, bubble will be regularly seen[42], the question is: when will it burst?

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Executive Summary

Ancient Greeks and Romans once described unicorns as incredibly rapid and light on their feet, with a horn that was highly prized by traders and investors. It's a characterization that can also be attributed to today's unicorn start-ups. The term "unicorn" was first used in this context in 2013 by Venture Capitalist Aileen Lee to describe privately held organizations with less than 10 years of life and a valuation above $1 billion. She chose this term to emphasize the rarity of these start-ups, as at that time we could count just 39 of these companies. In fact, building a private company worth more than $1 billion was just a dream and an aspiration for few people.

The situation has changed a lot over the years and being a unicorn is becoming almost "common" for a tech start-up. As of January 2021, there are over 500 unicorns around the world.

The mobile internet wave of the last 10 years and the advent of smartphones and applications have signed the beginning of the digital transformation. Thanks to this technological innovation and using successful strategies, Unicorns have disrupted existing markets or created new ones. Mostly, they are transforming entire industries, i.e. financial services, bringing the digital and the physical world together. As proof of the digital transformation that is happening, we can notice that 41% of the total $1,700B belongs just to three sectors: Fintech, Artificial Intelligence and Internet Software & services. At the beginning of their life cycle, these start-ups need a lot of money to make those ideas work. In the last decade, the amount of funding raised by private companies has reached new levels. During the last two years the average private funding per month has reached around $24B. Not even the global pandemic has stopped this phenomenon.

Many companies spend a lot of time searching for funding, while others may go over some of the funding rounds and move more quickly through the process of raising capital. Unicorns usually belong to the latter case, being companies with revolutionary ideas or backed by successful entrepreneurs. Investors, such as VCs, finance certain start-ups in exchange of a part of equity. This capital is needed to make investments and continue to grow.

Every round is based on different factors. Before a funding round, analysts need to make a valuation of the company based on the management, the market size, the risk and results obtained. Together with growth estimations and maturity level, these factors influence the type of investors to involve. The very first stage of funding usually comes from the founders, family or friends and it involves the capital needed to first develop the idea.

Then, the first official stage is the "seed" funding. These capitals will help the company to move its first steps and to finance market research or product development. The founders present a business plan to investors, usually venture capital, incubators or angel investors. During this phase, the risk of default is very high because the company does not have revenues yet and it still has to

go on the market. Therefore, the amount of capital can vary a lot, but it is usually between $10,000 and $2 million.

The product or service is then offered on the market and the company will be focused on reaching the highest customer base possible trying to minimize costs. At this point, the start-up may need new capitals to optimize the business, make new investments or access new markets. Series A funding is really important for the survival of the company, which needs to have a solid plan for long-term profit. During this stage the amount of capital raised used to be approximately from $2 million to $15 million, but with the advent of Unicorns $15 million is the average. Investors are looking for the best new idea, but it need to be backed up by a strong strategy to make that idea profitable. In Series A round we can start to see the interest of big venture capital firms, like Sequoia Capital that is investor of many of the top 10 Unicorns. Ensuring a big investor may also help to attract other investors who might want to follow.

In order to go over the development stage, Series B round help the company to expand the market and build a solid business model. If a start-up has gone through Series A, it means that it has developed a good customer base and investors know that it is ready for the next level. This round is quite the same of Series A in terms of processes, but there is the entry of later-stage investors and the average capital raised is around $33 million.

Series C funding is reserved to already successful companies that want to expand either organically or acquiring other companies. This round is an opportunity for investors to achieve high returns. In fact, companies at this stage have become less risky and they are now attracting new players, such as investment banks, hedge funds or public investment groups. These new investors are seeking an "easy" way to secure themselves a future big profitable exit through an acquisition or an IPO. Usually, external private funding used to stop at this round, but it is becoming more common to go over a Series D or even Series E funding. VC's aim is to capitalize the investment made through an exit, represented by an M&A or IPO, and these long series of funding are attracting more and more speculative investors.

Venture Capital's returns depends on the type of exit. There are five types of exit for Venture Capital:

- IPO (Initial Public Offering): stock market listing of the company
- Trade sale: sale of the company to another firm
- Management buyout (MBO): VC sells the shares back to the company
- Refinancing, or secondary sale: VC sells the stock to another institutional investor
- Liquidation, when the company files for bankruptcy.

The IPO is not an exit strategy per se because VC will list its shares on the market which cannot be sold for a determined lock-up period. They will have to sell them after it at the market price. This type of exit is considered as the most profitable for an investor. For a start-up, the decision of going public can be influenced by the desire of the VCs that are backing it to exit their investment. That is probably why an IPO is the most common exit for a Unicorn, which is usually heavily backed by VCs.

The second exit is the sale of the company. In this way, VC can immediately "cash-in" its investment by selling the shares to another private company. There is not many information available because this trade sales are private and do not have to be disclosed. In order for the VC to exit, there can also be the possibility of an exchange of shares with the ones of the buyer, allowing the VC to get less risky shares.

As shown in the figure below, the proportion between IPOs and acquisitions for Unicorns has increased over the last 10 years. Since 2015, two-third of them were public offerings. 2018 has signed the peak with 55 exits, 75% of which happened through IPO. The data regarding 2020 are updated to October for IPOs and July for the acquisitions.
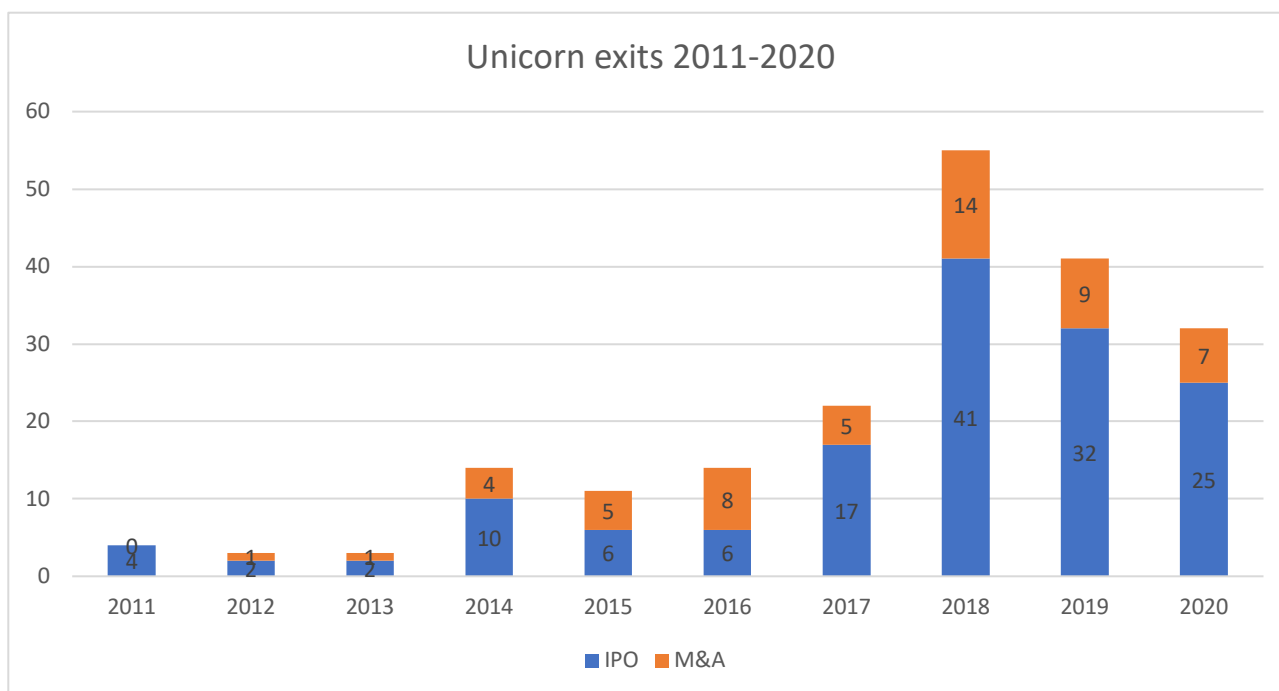
While VCs seek an exit to capitalize their investments, the economic environment did not always be on their side. Until 2018, most of Unicorns preferred to stay private for longer time waiting for the right time to go public. The main reason was the amount of capital available on the private market. Venture Capitalists have increased dramatically the resources invested on the market. From 2010 the total investment in all the funding series have more than quadrupled, signing new records

every year. It is easy to understand that, under these circumstances, a private company does not need to go public to raise the capital necessary for the growth.

Another reason that kept Unicorns private is to be found in in 2012 US JOBS Act. This law increased the number of shareholders that a company could have before having to disclose financial data to the SEC. The new threshold passed from 500 to 2000 shareholders. So, it was easier to raise more capital from different investors and to wait more time before being listed.

More time the Unicorns remained private, more challenging became the IPOs. It is known that the public market rewards companies with solid structures and stable profits, while private tech start-ups were basically valued on the expected growth. These fears have become reality with a series of disastrous IPOs, like Uber, Snap or Lyft because of the lack of profits or like WeWork that, thanks to an inadequate corporate governance had to step back from going public.

Despite this, in 2018 some of the highest valued Unicorns decided to go public, triggering a reaction in other companies that followed them. But why going public if not ready?

Santosh Rao, from Manhattan Venture Partners, said in 2019 that Unicorns were rushing their IPO to "ride the wave" of a bull market before being caught in the burst of a bubble.

One of the reasons is to be found on the excitement of investors on this type of companiey. Unicorns are connected with disruptive ideas and innovation, so they create big hype around them with the public anxious to invest on them. Unfortunately, the majority of these IPOs proved to underperform in the first years because the high valuations of the private market are not matched once public.

A key benefit of the IPO is that it will provide access to funding in amounts that Unicorns cannot find elsewhere. It also offers unicorn companies and their founders a chance to reward and attract the talent that has been key to their growth so far. It offers investors, primarily Venture Capitalists, the chance to exit and make a return on their investment and can raise their brand image and open up opportunities for new users. The whole process requires a solid corporate governance structure and a degree of integrity that "certificates" the organization as a credible business.

However, an IPO also leads to a level of investigation from investors and regulators that Unicorn firms might not be prepared for.

There is not a better choice than another on either staying private or going public. However, it has been possible to notice that there is a discrepancy between private valuations and public ones. The cases of Snap, Uber, Lyft have highlighted a big difference of views between VCs and investors in the public market. Everyone uses the same valuation methods, but, as these depend on many personal assumptions, every analyst gets a different result.

The three most commonly used methods are: Multiple Analysis, the Discounted Cash Flow (DCF) and the Dividend Discount Model (DDM).

The multiple approach is one the easiest and fastest method to evaluate a company, but also the least reliable. It is based on Law of One Price, but instead of using the cash flows, it relies on the assumption that comparable firms with similar cash flows will have the same value. In order to compare them, accounting ratios are used. These are called valuation multiples and express the market value of a key statistic that is assumed to be a good proxy for the stock value. These multiples, as we will analyze in the next paragraph, can be divided into two categories: equity multiples and enterprise multiples.

The analysis basically consists of three steps[43] to determine the value of a company:

1. Identification of comparable companies, in terms of operating and financial characteristics, industry

2. Definition and standardization of the market value of each company and creation of valuation multiples

3. Identification of the target company's value through the application of valuation multiples

Equity multiples are based on key statistics related to the shareholders' claims on the firm. These multiples consider the equity value, that is the price of the shares on the market, divided by a financial parameter of the company. There are four equity multiples that are usually used: Price on Earnings, Price on Book Value, Price on Sales and Price on Cash Flows.

Enterprise multiples are based on the enterprise value (EV) of a company, which is the sum of the equity value and net debt[44]. Since they measure the total value of a company, they are more useful with companies with a different financial structure. The most common enterprise multiples are EV/EBITDA, EV/EBIT and EV/Sales.

Multiple analysis is the is very common and easy because it requires minimal information. However, it relies on market values of comparable companies, taking them as good and not considering the irrationality of investors. Moreover, this valuation is just a picture of a company at a specific point of time, without taking into consideration business' dynamics and developments. Furthermore, it is almost impossible to reach an extremely accurate result because we should choose comparables that are as similar as possible to the target company, but in reality, we cannot find identical companies. For the reasons explained, the multiple analysis can be used together with other valuation methods, to compare them, but, alone, it does not lead to reliable results.

The Discounted Cash Flow (DCF[45]) model allow us to estimate the stock price of a company by discounting cash flows at the cost of capital. It is considered to be one of the most efficient method

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[43] Source: https://corporatefinanceinstitute.com/resources/knowledge/valuation/multiples-analysis/
[44] Net Debt = Debt - Cash
[45] From now on DCF

as it uses multiple information from the company's financial data. The DCF allow us to estimate the enterprise value that is the total value of the firm (equity value plus net debt).

The DCF model has three different applications: the WACC[46] method, the Adjusted Present Value (APV) method and the Flow to Equity (FTE) method. In this report we focus only on first one, that is the most widely used.

The Free Cash Flows discounted represent the cash generated by a firm, available to repay both equity and debt holders. It is calculated by adding the operating income after tax to the level of depreciation and amortization and by deducting the amount of capital expenditure and the increment of the net working capital. We need to forecast the free cash flows for 5 to 10 years. Then, they are discounted using the WACC of the firm, which is:

$$k_{WACC} = \frac{E}{E + D} * k_E + \frac{D}{E + D} * (1 - t) * k_D$$

Where E is the market value of equity while D is the market value of debt (net of cash). The latter is considered after tax (t) because the method takes into account the interest tax shield[47].

The present values of FCF will need to be added with a Terminal Value for the years after the forecast horizon. The DCF formula is then:

$$EV_0 = \frac{FCF_1}{(1 + k_{wacc})^1} + \frac{FCF_2}{(1 + k_{wacc})^2} + \frac{FCF_3}{(1 + k_{wacc})^3} + \cdots = \sum_{n=1}^{\infty} \frac{FCF_n}{(1 + k_{wacc})^n}$$

Once estimated the Enterprise value, the Equity value is calculated subtracting the net debt.

The DCF model is the most reliable and used method to estimate the value of a company. At the same time, it is also one of the most difficult because it is based on forecasts and personal assumptions on the future. Therefore, it is important that all the estimations to determine both free cash flows and cost of capital are as accurate as possible. Small changes can lead to very different results and that is why it is almost impossible to have exactly the same valuation from different analysts.

The application of the Dividend Discount Model (DDM) is based on the Law of One Price, for which the price of a stock equals the present value of the expected return an investor will receive. It, then, relies on future cash flows like the DCF. The difference is that in the DCF we consider the

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[46] Weighted Average Cost of Capital
[47] Interest tax shield = reduction in taxable income due to the deduction of interest expenses

cash flows available to the whole firm, while the DDM focuses just on shareholders. Therefore, this model assumes that the only tangible cash flow for a shareholder is dividends and it evaluate the stock discounting them. Obviously, in order to distribute dividends, the company must have positive earnings. Depending on the industry and on the stage of the life cycle of the company, the management may decide to retain all the earnings to reinvest them in the business.

The starting point are earnings per share which, multiplied by the payout rate give the dividend per share. Then it is assumed that the remaining part is invested in projects which give a return. The earnings for the following year are calculated in the same way, but with the addition of a growth rate, which is calculated as retention rate times the ROI. Dividends per share are now forecasted for 5 to 10 years, plus a terminal value, and discounted by the equity cost of capital, that is calculated applying the Capital Asset Pricing Model (CAPM). The Equity value is estimated.

Together with the DCF, the Dividend Discount Model is one of the most reliable methods to evaluate a company. It is based on dividends that are easier to estimate than DCF's free cash flow. However, it has many limitations, such as the dependency on assumptions and predictions, not only on earnings but also on the payout rate and long-term growth. Moreover, the reliance just on dividends leads to ignore other aspects that could bring cash flows to shareholders, such as share buybacks. The application of the DDM relies on data that, for private companies, could be difficult to find. Therefore, evaluating a non-listed company with this method could lead to unreliable assumptions and a falsified result.

Having clarified how companies can be estimated, the report focuses on Snap Inc. case, in order to understand what led to a multibillion valuation.

Snap Inc. is the company behind Snapchat, a messaging and multimedia app with which users are able to send instant photos, videos or texts that disappear after a few moments. During 2020, helped by the global pandemic, have had an average of 245 million daily users[48].

Snap was created in 2011 by three student at Stanford University, Evan Spiegel, Robert Murphy and Frank Reginald Brown. The first two are still managing the company. The growth of the company was quite fast. In a couple of years, they managed to reach 50 million Daily Active Users (DAU) and a total valuation of $2B. Snap participated in a series of funding rounds, raising a total of $2,6B and reaching a valuation of $20B by 2016. At the end of that year the management decided to list the company. At the time, Snap had a set of opportunities ahead, but also some challenges. Snap's first opportunities came from the market. Firstly, the economy was starting to do better. As a result, the Federal Bank of America increased the interest rate to slow down growth and control

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[48] Data retrieved from Statista: "Number of daily active Snapchat users from 1st quarter 2014 to 4th quarter 2020"

inflation. Furthermore, there was less uncertainty around Donald Trump's policies and this was calming down the markets.

Second, the mobile ads market was growing fast, substituting conventional advertising.
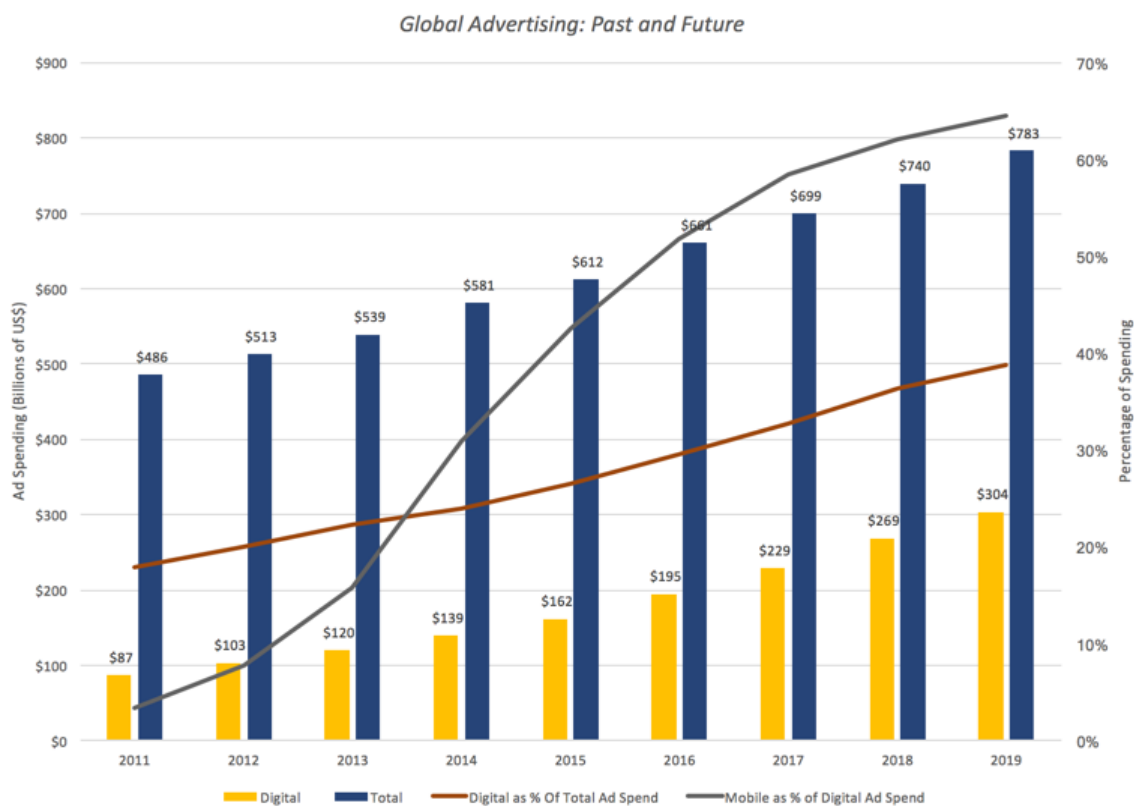
Source: Aswath Damodaran, "My Snap Story: Valuing Snap ahead of its IPO!", 2017

As shown in the figure above, in 2016 digital ad had revenues for almost $200B, more than doubled from 2012, and expected to grow to more than $300B by 2020. Mobile advertising was expected the one with the most growth, starting from less than 5% of digital ads in 2011 to be half of it by 2020 and expecting to generate revenues for about $200B (25% of total ad market of 2020).

This increase in demand could lead to two things. The first one is an increase in ad's prices since competition among companies to buy ads will grow. The second one is regarding the size of the market. This means that even if the competition among companies such as Facebook and Twitter is strong, there will still be room for Snap to get a share of this market. Finally, the demand for communication platforms like Snapchat has increased and this represented a good opportunity to significantly increase the number of users and at the same time increase the revenues. In addition, Snap was trying to diversify itself by placing different products on the market such as the Spectacles.

The second set of opportunities concerned the financial market. Even though the Fed was slightly increasing the interest rate, the cost of debt remained substantially low. As a result, a lot of private

companies were turning to bank's loans in order to get financed. Furthermore, Tech companies were staying private longer and they were often bought out before even going public. Hence, few companies were going public, as seen in Figure 9, and this was driving up investors' appetite for tech companies. So, with so little ''supply'' of tech companies in the public market and growing interest of investors for them, Snap seemed to be well-positioned for raising funds once listed.

Nevertheless, even if there were tremendous opportunities for Snap Inc, challenges remained numerous, starting from revenues. In the before the IPO, Snap experienced huge growth in revenues. However, they were unable to translate this growth into profits yet. Part of it was because they were ''burning cash'' by investing in research and development. Snap would need to find a good balance between investments and liquidity. On the same level, thanks to the inability to monetize its users. Snap had the lowest average revenue per user among all companies. Additionally, even though Snap was trying to diversify itself and pretended to be more than just one app, the truth is that Snapchat was its major source of revenue. This last point leads us to competitors. Snap's was facing strong competitors, Instagram on all. After having their offer rejected by Spiegel, Facebook decided to develop similar products to Snapchat, representing a real threat. This, coupled with the fact that millennials, Snapchat's main users, lacked brand loyalty, brings up a lot of uncertainty regarding the app's future. Instagram, backed by Facebook, was Snapchat's biggest challenge and in order to be the leader in the market, they needed to make more efforts to attracts new users. Also, since Snapchat was the main revenue generator for Snap Inc, they would have also needed to make more efforts to diversify them.

Another challenge that Snap was facing was attracting talents. As said previously, the American economy was recovering. In fact, it has reached the lowest unemployment rate since "The Glorious Thirty'' years. With the technology sector growing rapidly and low unemployment rate, talents were rare, and Snap had to compete with giants like Google, Facebook or Amazon, who offered exceptional working conditions and high salaries. Furthermore, Snap was dependent on Google's Cloud technology and Amazon's web services. In fact, they had signed long term contracts with both. Finally, the last challenge concerned the structure of the company. The founders had full control of the company since they were about to offer only non-voting shares on the public market. This offering would represent the first time in the history of the market exchange that a company attempted an IPO trying to place solely non-voting share. The idea of investing money without being able to say something was raising doubts in investors. Ken Bertsch, executive director of the Council of Institutional Investors, said that Snap should not have been allowed to list on any exchange market because it basically had access public equity funds without voting strings and keeping to operate like a private company.

On March 2, 2017, Snap got listed on the NYSE. The underwriters chose a target price of $17 per share, but, thanks to the hype around the company, the stock opened at a price of $24 per share, 41% higher. The first impression was that Snap had been underpriced, leaving a lot of money on the table. Some analysts started to raise some doubts about the numbers did not add up and started to rate the stock as a "Sell". Meanwhile, after a couple of weeks from the IPO Morgan Stanley, one of the underwriters released a note saying that they had overstated the forecasted earnings by $5B over 5 years[49]. Their review included also a correction of the WACC used and this measure allowed to leave the target price unchanged. However, reporters noted that the WACC used by the Morgan Stanley's analyst was lower than the one given to Facebook, that was making $10,2B of net income, in contrast with Snap's lack of profit. This set an example of how valuations, even from analysts that move the market, are highly affected by subjective opinions and assumptions of the single analysts. The valuation of this report starts with forecasting revenues. The primary, if not the only, source of revenues is represented by the sale of advertising products. As already introduced, the global ad market was growing, thanks to the outbreak of digital and mobile advertising boosted by the rise of social media. The revenues had a huge increase of 509% from 2015 to 2016 going from $58,7 million to $404,5 million. The slower increase of costs of revenues led to a higher gross profit. However, the investments made and the growth of the app has dragged down the EBIT to a negative $520,4m. As the main source of revenue for Snap is advertising, the best starting point to forecast them is to consider the underlying forces behind changes in revenue, which are DAU and ARPU[50]. The number of users was following a positive trend, but during the last quarters the growth was slowing down so in the analysis we assumed a drop in the growth of 50% as a result of the immediate competitive threat presented by Instagram launching a similar story function as Snap. The post IPO performance metrics of Snap's close competitors (Google, Facebook, Twitter, and LinkedIn) provides the basis for the estimation of ARPU. Retrieving the median growth rates of the peers' revenues following their IPOs seemed to be a plausible orientation for Snap's future development. However, given the larger user base and the established market reputation of the mentioned competitors as well as due to certain risk factors involved in Snap's further development, we adjusted Snap's growth rates slightly downwards.

Once estimated the growth, ad revenues are calculated taking the DAU forecasted before and the ARPU, as shown in the figure below.

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[49] Matt Turner and Rachael Levy, "Morgan Stanley made an error analyzing Snapchat, and it shines a light on some big flaws in Wall Street research," *Business Insider*, April 4, 2017

[50] ARPU: Average Revenues per User

	2016 Act	2017 Act	2018 Exp	2019 Exp	2020 Exp	2021 Exp	2022 Exp	2023 Exp	2024 Exp	2025 Exp	TV Exp	Instagram Act2016	Facebook Act2016	Twitter Act2016
DAU	158	196	238	283	327	368	412	461	517	579	648	345	1277	129
Growth in DAU	*48%*	*24%*	*21%*	*19%*	*15%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*			
Hours p. DAU p. Day	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,42	0,36	0,58	0,15
Ads p. DAU p. Hour	**0,6**	**2,06**	**3,26**	**4,35**	**5,47**	**6,76**	**8,15**	**9,97**	**12,47**	**16,06**	**18,63**	**6,60**	**48,60**	**104,30**
Average Pricing	$27,8	$25,8	$23,8	$21,8	$19,8	$17,8	$15,8	$13,8	$11,8	$9,8	$7,8	$6,0	$2,0	$3,0
Days per Year	365	365	365	365	365	365	365	365	365	365	365	365	365	365
ARPU	$2,6	$8,2	$11,9	$14,6	$16,6	$18,5	$19,8	$21,2	$22,6	$24,2	$22,4	$5,2	$20,6	$17,1
Growth in ARPU	*367%*	*219%*	*46%*	*22%*	*14%*	*11%*	*7%*	*7%*	*7%*	*7%*	*-8%*			
Ad Revenue	**$405**	**$1.596**	**$2.832**	**$4.127**	**$5.447**	**$6.797**	**$8.144**	**$9.757**	**$11.690**	**$14.005**	**$14.495**			

If Snap manages to keep its drive, ad revenues will be $14B in 2025 from the $405m of 2016. For the years after 2025, a terminal growth rate of 3,5% have been used in the model, using the US Treasury bonds as a benchmark.

The cost components that need to be subtracted from the Revenues are all estimated using Morgan Stanley assumptions. Then, based on these assumptions, it is possible to estimate FCF:

	2016 Act	2017 Act	2018 Exp	2019 Exp	2020 Exp	2021 Exp	2022 Exp	2023 Exp	2024 Exp	2025 Exp	TV Exp
Net Revenue	$405	$1.596	$2.832	$4.127	$5.447	$6.797	$8.144	$9.757	$11.690	$14.005	$14.495
Operating Costs	$864	$1.716	$2.544	$3.449	$4.539	$5.433	$6.572	$7.748	$8.908	$9.995	$10.345
EBITDA	-$459	-$120	$288	$679	$908	$1.364	$1.571	$2.009	$2.781	$4.010	$4.150
D&A	$28	$112	$198	$289	$381	$476	$570	$683	$818	$980	
EBIT	-$488	-$231	$90	$390	$526	$888	$1.001	$1.326	$1.963	$3.030	
D&A	$28	$112	$198	$289	$381	$476	$570	$683	$818	$980	
Cash Taxes	$0	$0	$0	$0	$86	$266	$300	$398	$589	$909	
Change in NWC	$151	$434	$333	$292	$254	$206	$198	$208	$171	$127	
CapEx	$67	$140	$141	$138	$133	$128	$124	$124	$128	$136	
Stock-based Comp.	$32	$75	$159	$203	$257	$317	$421	$533	$648	$759	
FCF	-$709	-$768	-$346	$45	$178	$447	$527	$746	$1.245	$2.078	$2.151

Then, the WACC needs to be estimated. Since Snap has a positive net financial position and 0% leverage, then the WACC equals the equity costs of capital, as equity is the only source of funding. Therefore, we refer to the Capital Asset Pricing Model to determine an appropriate discount rate for Snap. The most appropriate choice for the risk-free rate is the 10-year treasury yield of 2.38%. For the market risk premium, we compute the daily returns of the S&P 500-index in the three most recent years before the IPO to arrive at an average market return of 9.41%, implying a risk premium of 7.03%. Going to the beta estimation, Since Snap, logically, was a private company before its IPO, no previous stock returns are available. Therefore, we have to refer to a peer group of companies operating in the same field of business being subject to the same systematic risk. The Refinitiv Eikon platform (ex Thomson Reuters) provides the 3-year beta for these companies as well as their respective leverage ratios. Thus, unlevering them allows to find their respective business risks without the influence of the respective capital structure. Aggregating these values allows to find an average beta of 1,16.

The DCF model is then complete, leading to an Enterprise value of $16B.

	2016 Act	2017 Act	2018 Exp	2019 Exp	2020 Exp	2021 Exp	2022 Exp	2023 Exp	2024 Exp	2025 Exp	TV Exp
Net Revenue	$405	$1.596	$2.832	$4.127	$5.447	$6.797	$8.144	$9.757	$11.690	$14.005	$14.495
Operating Costs	$864	$1.716	$2.544	$3.449	$4.539	$5.433	$6.572	$7.748	$8.908	$9.995	$10.345
EBITDA	-$459	-$120	$288	$679	$908	$1.364	$1.571	$2.009	$2.781	$4.010	$4.150
D&A	$28	$112	$198	$289	$381	$476	$570	$683	$818	$980	
EBIT	-$488	-$231	$90	$390	$526	$888	$1.001	$1.326	$1.963	$3.030	
D&A	$28	$112	$198	$289	$381	$476	$570	$683	$818	$980	
Cash Taxes	$0	$0	$0	$0	$86	$266	$300	$398	$589	$909	
Change in NWC	$151	$434	$333	$292	$254	$206	$198	$208	$171	$127	
CapEx	$67	$140	$141	$138	$133	$128	$124	$124	$128	$136	
Stock-based Comp.	$32	$75	$159	$203	$257	$317	$421	$533	$648	$759	
FCF	-$709	-$768	-$346	$45	$178	$447	$527	$746	$1.245	$2.078	$2.151
TV											$30.452
Enterprise Value	$16.067										

Adding the excess cash to it, the Equity value is $17B with a share price of $14,45.

This value has been reached under assumptions that could partly be considered as aggressive and are without any doubt subject to many uncertainties. Thus, two sensitivity analyses have been made to highlight how slight changes of input might impact the suitable target price. This analysis it to be compared to the valuation given to the company during its IPO.

On March 2, 2017, Snap got listed on the NYSE with a share price of $17 and a total valuation of $23,6B. The hype around this IPO, which represented the highest tech IPO since Facebook, was so high that on the first day of trading the stock closed with a +44%. But that was it, and the price started to fall until 2020.

The analysis carried out highlighted that the assumptions made by the underwriters of the IPO were too optimistic. Due to a high competition with Instagram and a "trade war" to get ad market shares, the growth in revenues was not that easy. The report can affirm that Snap was overvalued. The public market realized the same during the first week of trading, as evidence of slower growth rates started to show. The Snap case has set the base for the Unicorns' overvaluation theory behind this report. The assumptions made on the private market are quite different with the public one, as investors in the stock market are focused on short-term figures, profitability and the corporate structure.

Evan Spiegel, Snap's co-founder and CEO, a few months after the IPO acknowledged that they had misjudged some assumptions about the market and that they underestimated how important is the communication on the public market as you need to explain how the business works to a huge investor base. But Snap is not a stand-alone case. During the years after 2017, many other Unicorns were "slaughtered" as entered the public market. The most famous are Uber, Lyft, Slack and the We Company, even if the latter did not even manage to get listed and withdrew the offering. All these Unicorns have in common the billions of dollars raised privately since early years and huge

fall once listed on the stock exchange market. Uber got listed with a share price of $45, opened trading at $41,57, with an average price of $35,6 after a year. Lyft, priced its shares at $72 each, closed its first day at $78 and by the end of the year it lost 44% of its value258. Slack debuted with an IPO price of $39, it closed day one at $38.6 but then lost 42% of the value by the end of 2019. Then, The We Company, known as WeWork, got under public scrutiny after having filed for IPO with a valuation of $47B. Analysts reviewed the valuation to $10B after discovering weak financial statements and governance and the company decided to withdraw the offering.

W. Gornall and I.A. Strebulaev made a report[51] developing an adjusted model for Unicorn valuation and found out that, the average start-up examined was overvalued by 48%, with the ten most overvalued companies overvalued by 145%. These cases raise some doubts about private value assessments and what emerge from the analysis is a bubble. The definition of bubble is not clear and not everybody sees it the same way. The 2013 Economics Nobel Prize Robert Shiller defined a speculative bubble as:

> *"A situation in which news of price increases spurs investor enthusiasm which spreads by psychological contagion from person to person, in the process amplifying stories that might justify the price increase and bringing in a larger and larger class of investors, who, despite doubts about the real value of the investment, are drawn to it partly through envy of others' successes and partly through a gambler's excitement"[52]*

Thus, does that mean that private investors are irrational? Not necessarily.

As already stated, VCs are in search of high returns investment. Tech start-ups are going through more and more funding rounds, and later-stage investors often force to put some protective clauses to hedge potential losses. Example of clauses can be:

- Investors get extra shares if the IPO price is lower than the price paid
- The right to pull out of the IPO if the public valuation is lower than private's
- Liquidation preferences: the investor gets its money back first in case of the company's liquidation

The most aggressive later-stage investor is SoftBank's $100B Vision Fund, which is focused on emerging technologies companies. It is by far the biggest investment fund and their strategy is to invest a minimum of $100 million in companies that seem ready for the market. Vision Fund is responsible for many huge private valuations, which strengthen what said above about start-ups overvaluation. Examples of huge investments are $10,5B funding in Didi Chuxing, currently

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[51] W. Gornall, I.A. Strebulaev, "Squaring Venture Capital Valuations with reality", National Bureau of Economic Research, 2020

[52] R. J. Shiller, "Irrational Exuberance: (Second Edition)", Princeton; Oxford: Princeton University Press, 2005

second most valued Unicorn, $8,7B in WeWork and $8,3 in Uber, and we know how it went with these two companies.

The on-going global pandemic has signed a definitive consecration of the digital transformation, as people around the world are forced to online tools. A line has been drawn between "inside" and "outside" companies[53]. The former, like Snap, are experiencing growth in revenues, users and profits, while the latter are struggling. The same distinction can be made for Unicorns and it can be outline what will happen in the nearest future. "Inside" companies will be preferred by investors and the amount of private funding will not decrease, as seen in the record reached in 2020.

Recalling Shiller's definition of bubble, it is possible to say that investors will still invest "emotionally" for the foreseeable future.

However, the average stock market return of the last 10 years and the record signed in 2020 should be a wake-up call. Given the fact that, due to social psychology, bubble will be regularly seen[54], the question is: when will it burst?

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[53] Shawn Mattar, "Inside Versus Outside: A Tech Perspective,", April 2020
 https://www.linkedin.com/pulse/inside-vs-outside-tech-perspective-shawn-mattar/

[54] R. J. Shiller, "Irrational Exuberance: (Second Edition)", Princeton; Oxford: Princeton University Press, 2005