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AN INVESTIGATION ON THE ECONOMICS OF UNICORNS AND THEIR VALUATIONS AS A SIGNAL OF A NEW TECHNOLOGICAL BUBBLE

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ABSTRACT

In the last decade, global economy has been severely hit by the burst of the Dot-Com bubble, with public high tech companies' valuations reaching levels far from their fundamental values. Nowadays, it appears that a valuation issue is occurring in the private equity markets. Private high tech companies are experiencing skyrocketing valuations in their early life known also as "Unicorns" for having a valuation above $ 1B. Strongly supported by Ventura Capital funds, these companies are staying private more than ever. The few of them that have decided to go public have seen their stock prices fall to levels below their pre-IPO valuations.

Even though this phenomenon is restricted to the private market, it appears that public market investors are also entering in these type of investments at the later stages of funding. Led by a strong technological wave, these companies have an enormous quantity of cash to back up their operations and are creating new markets, while disrupting traditional ones. This supply of cash has reached abnormal levels, with a huge abundancy of committed capital by investors who are actively chasing profit opportunities. However, even if these companies are highly innovative, their valuations are difficult to understand when they still have not turned profitable. In 2015, the SEC has also started an investigation in order to understand how private equity funds and mutual funds assign valuations to these companies. In this paper have been analysed the most used valuation methods and only the Discounted Cash flow method, with the variation of starting the analysis from the future and work backwards, seems to be the only model that could give reliable results. Still, the quality of

assumptions is crucial and results could be biased by different interpretations of markets, competitive environment and companies' financial data.

From the findings of this paper, it appears that the mechanisms behind the private equity market for high tech companies have changed. Companies are staying private longer, funding rounds have increased and companies reach $ 1B valuation in little time (in just 18 months). Yet, public markets seem to be less euphoric and are not supporting these atypical valuations. However, data shows that there are the conditions for a bubble to be already in place. Its growth will depend on how private market participants will behave: will they continue to raise Unicorns' valuations or will they start down rounds in order to reach public markets with little losses? Additionally, government intervention, which is now missing or has been pro-Unicorns, will need to be weighed against the effects on society and macro-economic aspects.

Article I. INTRODUCTION

The public and private financial markets have played a key role in shaping the world in the past 70 years, and it has become clear that their soundness is crucial to the health of the society. Over time, booms and crises have occurred and their effects have been significant on people and society. Most of the times, their occurrence was due to assets' valuations that were far from their fundamental value. Depending on the market sentiment, either bullish or bearish, valuations of certain assets have floated both in the private and public markets substantially. Mainly the in public markets, it is possible to observe how valuations with little ground of proof have caused severe problems for the global economy. Simply by recalling the Dot-Com bubble in 2000 or the housing bubble in 2008, it is possible to notice that what they have in common is a problem of valuation of certain categories of assets. A valuation issue that is arising lately is the one concerning high technology start-ups. Without doubts, the technology sector has experienced huge growth in the last 20 years, with the Internet opening up new markets and growth prospects. For investors, the Internet has created the opportunity to direct their money to companies that could experience an exponential growth. These high tech companies have been ground breakers in the society, like Facebook or Google. Yet, many other companies, like observed in the technological bubble of the 2000s, have failed to proof their solidity and have disappeared over the years. From 2009 onwards, it has started a new wave of highly valued private technological companies, also known as "Unicorns". In this paper will be discussed and analysed the possibility that these Unicorns have been given a too high valuation as a symptom of a possible malfunctioning of the private equity market, resulting in a bubble. In the second

section of the paper it will be analysed the current global economic environment, the mechanisms behind the private equity market and it will be carried on an analysis of the private equity market during the 2000 Dot-Com bubble. In the third section, it will be discussed the rationales behind economic bubbles with an in-depth analysis of the 2000 Dot-Com bubble. Consequently, in the fourth section of the paper it will be discussed the different methods of valuations that are mainly used nowadays. For each method it will be observed advantages and disadvantages as well as the best conditions for each model to give a truthful valuation result. In the fifth section of this paper it will be investigated the nature of "Unicorns", their behaviour in private and public markets as well as a comparison of the current private and public market technology sector with the Dot-Com bubble situation. Moreover, it will be taken two examples of Unicorns that have gone public recently and how they are being perceived by financial markets. Instead, in the sixths section it will be discussed how high tech start-ups grow, the way they attract Venture Capital funds and how Unicorns create value for the society. In order to have a better understanding, it will be used a sample of three Unicorns that will serve as a practical case study. In the seventh section of this paper it will be observed a method of valuing high tech start-ups in order to have a reliable valuation. The method discussed will be theoretical and real-life examples will be used only when possible[1]. The last section will deal with the finding of the paper and draw a reasonable conclusion on the correlation between skyrocketing Unicorns' valuations in the private market and the presence of a financial bubble, as well as implications for the society.

[1] Due to confidentiality of Unicorns' financial data, it has not been possible to use the valuation model on a Unicorn and bring a practical example.

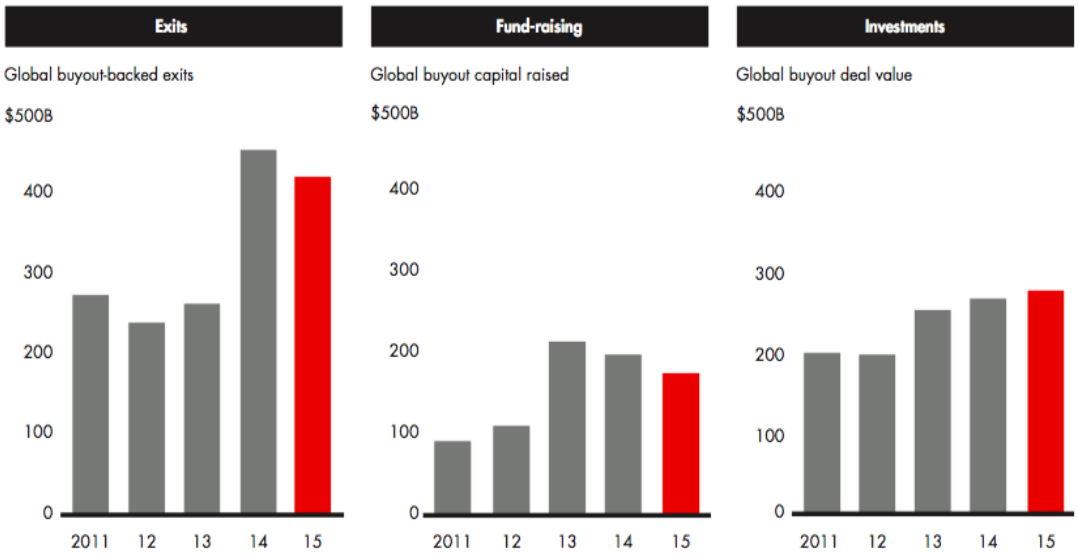
Article II. THE PRIVATE EQUITY MARKET

Section 2.01 THE CURRENT ECONOMIC ENVIRONMENT: A FOCUS ON THE PRIVATE EQUITY MARKET

The economic environment in which the world is now in is quite different from the previous decades. Currently, an economic cycle is ending and a new one is beginning. The cycle that the world is leaving behind is one that has begun in the 80s and that has been characterized by returns to investors that have been higher than long term averages. In terms of stock returns, investors in western countries have experienced on average 7,9% return, compared with the 100-year average of 6,5% return in the USA and 4,9% in Europe. Regarding bonds, in the US in this 30-year period investors have seen a return of 5,0% while in Europe it has been of 5,9%. Compared to the 100-year average of bond returns of 1,7% in US and 1,6% in Europe, this period has been very prolific for investors. Expectations for the new cycle are undeniably lower, with equity returns of 4%-6,5% for the USA and 4,5%-6,0% for Europe, with forecasts for fixed income investors of returns even lower between 0% and 2% for both the USA and Europe. Thus, the situation that might be ahead is a low-return environment, with future market returns that will likely be lower than now (Tim Koller, 2016). Moreover, the recent driver of asset prices has been central banks' monetary policies, whose effect could be fading away. Besides, volatility doesn't seem to lower, fostered also by the recent Brexit, is increasing ahead. By taking a look at the Private equity market,

2015 has been a year that has proved healthiness of the PE market, but it has not reached the levels of 2014. Actually, due to an economy that is showing mixed signs together with intense competition and economic conditions in markets that have been analysed above (e.g., low interest rates, increased volatility) there are many challenges ahead. In 2015, from private company exits have begun a strong wave of mergers and acquisition. Yet, the global buyout-backed exits' levels of 2015 are lower than 2014, but also this year PE market has outpaced the performances of public markets. However, by looking at the levels of fund raising, it is possible to see that from the peak of 2013 of roughly $ 200B the levels have been declining throughout 2014 and in 2015 too. On the other hand, the buyout deal value in 2015 has increased even more, reaching more than $ 250B, on a 5-year time-span, has been the highest (BAIN & COMPANY, 2016)

Figure 1: Exits, fund-raising and investment levels in the Private Equity market in 2015



[2]

In the next section it will be analysed the mechanisms behind the private equity market, its players and the investment rational that guide them.

Section 2.02 OVERVIEW OF THE PRIVATE EQUITY MARKET AND ITS MECHANISMS

Private equity is the method of providing long-term capital to help companies that are not quoted on the public markets to grow and flourish. There is a functional difference between private equity and raising debt. Debt lenders legally have the right on interests and loan repayment, regardless whether the business they have invested in goes bankrupt or grows. On the other hand, private equity is an equity investment for which

[2] Image taken from (BAIN & COMPANY, 2016)

outside investors obtain a stake in the target company, and as shareholders, their returns are dependent to the profits of the business.

Private Equity (PE) includes different types of investment methods into private and public companies. Private equity investments can be segmented into the following categories:

- Venture Capital (VC): It is frequently associated with investment in the early stage, young companies, start-ups, and is often referred to as "risk capital".
- Expansion Capital: It encompasses private investments in already established companies in order to fund growth opportunities and strategies to enter new markets
- Buy-Outs/ Buy-Ins: Are private transactions in which funds are provided by private investors to enable acquisition of an existing company (management buy-out) or they are provided to outside managers of the company to buy in the company (management buy-in)
- Private Placements: Investments in which a private equity investor provides liquidity to existing shareholders by purchasing outstanding shares
- Pre-IPO funding: Investments in private companies before their Initial Public Offering (IPO), for which the private equity investors assist the company in its IPO process and subsequent floating.
- Private Investment in Public Entities (PIPEs): PIPEs are private equity investments in public companies, which are not excessively traded by financial

operators and don't have an easy access to markets to raise funds, that have similar traits to private companies.

Depending on the nature of the PE investment, usually their time horizon is between 7 to 10 years. Initially, private equity managers search for investment opportunities, investing in private companies only when appealing business opportunities are found. The ending investment stages are focused on managing existing companies or seeking further investment or exit opportunities.

In essence, there are three arguments that are put forward to explain the private equity model of investing:

1. Seekers of market failure: The first argument, and perhaps the simplest one to occur, is when private equity tries to capture and take advantage of market failures. Market failures occur when the market is wrongly pricing investments, creating a failure since in theory prices in the market should always be correct and fully reflect the information available at that point in time. This argument encompasses a trading strategy that, by taking advantage of cyclic mispricing, and with a continuous search for financial gain, benefits from these 'loopholes'.
2. Solving the principal−agent problem: The second argument, which is the most widespread, is the principal–agent problem in companies. The principals are the shareholders of the company, thus the owners, while the agents are usually the managers, hence the ones that should act on behalf of the principals to run the company. Usually, managers should be incentivised by their compensation

scheme to increase and maximize continuously company's value and ultimately the one of its shareholders. However, it is extremely difficult to account managers for their actions and to understand if the way they are running the company is not optimal. In public companies, if a shareholder is not satisfied with the way the company is run, it can simply sell its shares and close the position in the company. Instead, in private companies, it is almost impossible for the owner of the company to simply sell its shares and close the investment with the simplicity that is done in public markets. What commonly occurs is that private companies are either run by managers that take on projects with too much risk or that are too conservative. In either way, the losses are high for the owners. To solve this issue, private equity tries to tightly align the interests of agents and principals to obtain economic efficiencies for both sides.

3. Sacrificing liquidity to solve information asymmetries: It is possible to reduce risk by investing in assets that are easier to sell, thus by having higher level of liquidity, or by increasing the level of information prior and during the investment phase in order to manage more effectively the risk of the investment. If both strategies are accomplished, it is possible to achieve consistently superior returns with lower risks than any other market player (this is one of the main reasons why insider trading in public shares is forbidden by investment laws). Actually, liquidity is often exchanged for information, leaving few opportunities to really achieve both. If in public markets the trading level is high and vigorous due to the fact that the information availability is scarce while the liquidity is comparably higher, in private equity

occurs the opposite. Private equity is not about trading on a short term basis, but rather performing long term equity investments, which are illiquid and with the trading that occurs only at the acquisition or exit stage. At acquisition and at the exit is when there is the highest level of information available due to due diligence performed by fund managers.

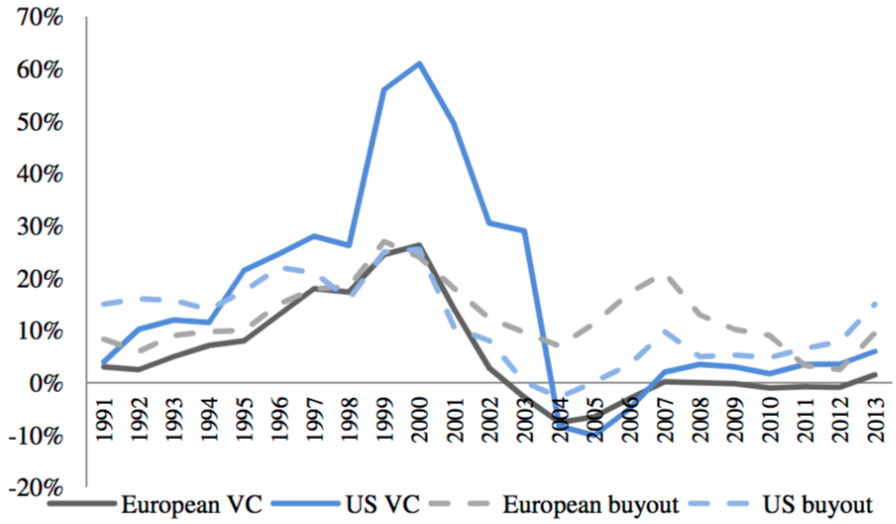
The way Private equity invests and the rational that are behind it are among the reasons for the higher performances over public markets. In the next session it will be observed how private equity funds have behaved during the 2000 Dot-Com bubble.

Section 2.03 THE PRIVATE EQUITY MARKET DURING AND AFTER THE DOT-COM BUBBLE

The effect of the Dot-Com bubble has been enormous, leading not only to changes in performance but also the strategies of investment have muted. The burst of the Dot-Com bubble has had drastic effects on the private equity sector, with huge losses. It took several years for the private equity to recover and return to pre-crisis levels. Moreover, the effect of the bubble was similar both in Europe and US. It is well known that the Private Equity market of the USA is much more developed than the European one (Balázs Fazekas, 2015), as is possible to observe in the image below where are plotted movements of the 5-year rolling horizon IRR in the US and EU between 1992 and 2013. Furthermore, there is a correlation in movements between the two regions,

but in Europe Venture Capital investments have been much more affected by the bubble, while in US is where it is possible to observe the sharpest decline in IRR.

Figure 2: Movements of 5-year rolling horizon IRR for EU and US



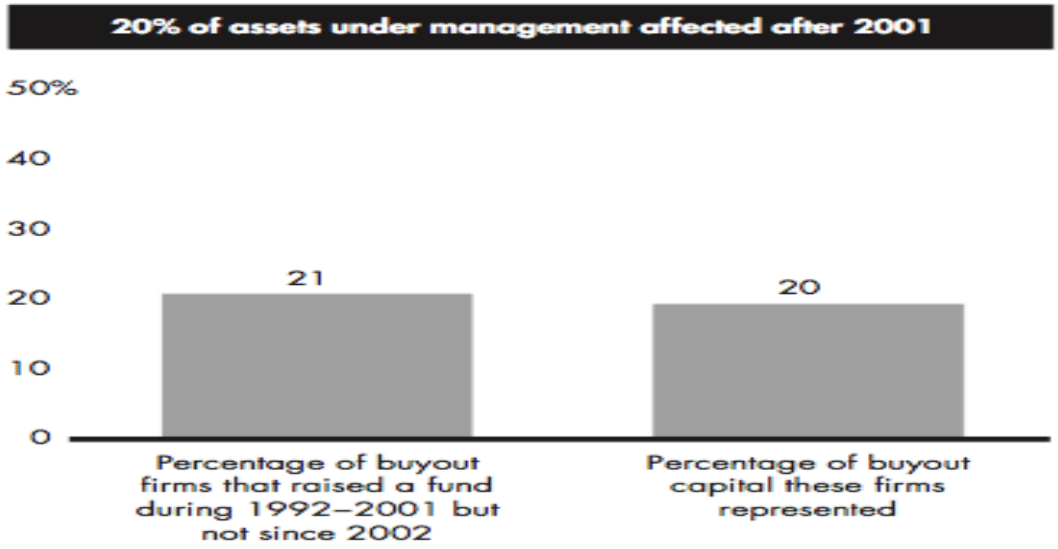
[3]

Between the end of 2001 and 2002, the private equity industry, in particular the Venture Capital sector, experienced what was at that time the biggest ever decline. The biggest losses occurred in the Telecommunication sector (-38,3%) and in Internet-related companies (-27,7%). With no surprise, these industries had extraordinary 3-year returns of 69,7% and 35,7%. Without any doubt, the Internet-Telecom boom and burst had visible effect on the Venture Capital sector. Looking at numbers, for the National Venture Capital Association (NVCA), investments in the last quarter of 2001 were at $ 7.1B, which was about a third of the prior year, when it was $ 20.9B. Likewise, the amount of capital raised in the last quarter of 2001 was around $ 4,6B,

[3] Image taken from (Balázs Fazekas, 2015)

and it was 80% lower than the previous year, when it was $ 23.4B. However, by comparing the numbers of 2001 with the ones of 1999, it is possible to observe that in the last quarter of 2001 capital investments were slightly more than in the first quarter of 1999. In 2001 the annual amount invested was $36.5M, which was more than five folds larger than the one of 1995, when the annual amount was $5.9B. Moreover, 21% of the 196 firms, which were active fund-raisers between 1992-2001, did not raise any other fund after 2002 (BAIN & COMPANY, 2016)

Figure 3: Analysis of buy-out firms that didn't raise capital after 2002



[4]

If the industry is in a boom or a burst depends only on the perspective that is taken: in the short term it could be wrongly assumed that the industry is in a burst, but by observing the long term, the industry seems to maintain a strong growth throughout the years.

[4] Image taken from (BAIN & COMPANY, 2016)

It is interesting to notice that during the Internet boom, companies begun to go public earlier than ever before. Before Netscape, it was unthinkable for a company to go public with only one product making 100% of profits.

After Netscape, relying only on a single product became extremely common. Companies were now able to go public without even making profits. These companies were mainly start-ups and for the very first time stock markets were exposed to the risk of early stage companies. What was observed during the years of the bubble, was that good companies grew even bigger while losers were hard to spot and before exiting the market they were given the possibility to burn tons of money. However, the failure rate of quoted Internet companies in the years of the bubble for sure has been among the highest between all the industries.

It can be argued that what happened during the bubble is an overreaction both to the higher returns experienced at the beginning of the bubble in 1998-1999 and to the lower returns that were generated during 2001 and 2002. Usually, winners and losers are spotted at similar rates since at any point in time there are new winners and new losers. However, due to the euphoria that the Internet had brought in the market, early winners, such as Amazon and Ebay, were regarded as the new industry standards. Any investment was meant to replicate their success. Despite the initial growth prospects, the losers at a certain point showed up in numbers. Due to the vast quantity of companies that was not able to turn their negative cash flows in profits, the market overreacted by implying that the new state of art was an environment with low returns. Very few people considered that the return volatility was a temporary deviation from the normal rate of returns obtained before the beginning of the bubble. Actually, few people realized that they were in a bubble.

An important change that occurred during and due to the bubble was a mutation in the competitive structure of the Venture Capital industry. The way Venture Capitalists competed was altered in two fundamental ways: Firstly, with the massive entrance of new players in the industry, leading to a huge increase in supply of funds and of investors willing to find the new Amazon and EBay. The problem that this new condition created was the lack of expertise that could only understand the deal side of the investment but not the business side. With the industry flooded with investment bankers, valuations sky rocked also for companies that were lacking of true competitive advantage. Secondly, the changes in the competitive environment also affected Venture Capitalists with high experience. The success that they were having during the Dot-Com bubble changed their own business model in different radical ways that they could not anticipate. The most significant change was that limited partners begun to experience an abundancy of money. The amount of money that they could rise increased exponentially, but management fees of 2% that they earned remained the same. However, if the money and businesses grew, the number of new partners that were introduced in the business grew only moderately, leaving a larger portion of earnings to current partners.

With the more money that the partners were making, three different investment schemes emerged in the Venture Capital sector:

1. Investments in more companies: The fundamental concept of Venture Capitalists is that the value they bring to a company is not only the amount of money but also their expertise in how to handle the business and let it grow. With many more companies in their portfolio, the time that Venture Capitalists

had to increase the value of each of their companies was drastically reduced. Being in too many investments gave little time to truly understand the business.

2. Over flooding companies with capital investments: Venture Capitalists were not thinly investing their money, rather placing big money in companies that didn't need so much. Consequently, companies' valuations began to lack as well as checks on the health of the business. The risk to over-fund companies became evident later in time, with the winners that benefited from higher levels of funding and grew quicker, while the losers were given the possibility to operate well ahead of their real potential.
3. Shift of investment habits: Many early stage investors moved to investing in later stages of the investment cycle. The theory of early and late stage investments is based on the fact that if early stage investments are priced wrongly, there will be in the future an undervaluation and deals will slow down. In the Dot-Com bubble, it is exactly what happened: as early stage investors were giving high valuations to many companies, lots of which were not able to sustain competition, later on the road late stage investors realized that these companies were overvalued. Instead of receiving new rounds of funding, these companies had to go through "down-rounds" and required turnaround expertise to solve their problems (Thomas Hellmann, 2002).

Overall, the effects of the bubble have been huge. The effects of 2008 financial crisis have been marginal on the Venture Capital sector, but overall for the private equity industry have been severe too (the worst in 70 years) and it is not until 2012-2013 that

is possible to observe again an upward trend in the rate of returns (BAIN & COMPANY, 2016).

Article III. FINANCIAL BUBBLES: HOW THEY ARE CREATED AND THEIR EFFECTS ON THE ECONOMY

It dates back to 1997 the beginning of the 2000 Dot-Com bubble and in 2003 the end of the effects of the bubble on stock prices. In the begging of the 2000s it can be found the starting point in which the bubble burst. In just 3 years the market reached astronomical valuations, with IPO proceeds which were among the highest of all time. Even more noticeable, was the kind of companies which were given huge levels of capital but didn't offer any kind of assurance on the solidity of their business, a part from a prosperous future. Before investigating what really happened in the Dot-Com bubble, what the world economy has learnt and the current implications, it must be assessed what is a bubble and why it occurs.

Section 3.01 THE NATURE OF FINANCIAL BUBBLES

A bubble is an economic phenomenon where asset prices increase above their true value due to uncontrolled market euphoria and/or huge availability of money in the system. An economic bubble occurs whenever the price of an asset, which is freely

exchanged in an established market, first increases and then sharply declines at a growth rate higher than it would normally be achieved by holding or owning the same asset. The fundamental acceptance of a huge rise in price is given by the fact that the intrinsic value of assets can vary substantially. And in those years, the intrinsic value of these assets has reached exorbitant levels away from previous valuations. When these assets' prices rise too far from their fundamental value, becoming unsustainable for investors, the market euphoria is replaced with pessimism and the bubble bursts. The price of assets falls in a short time laps at-or below their fair value, with huge losses for investors and for the society in the short, medium and long term, depending on the severity of the bubble.

Initially explained by Miskyn, the cycle of a bubble follows (with exceptions) a 5 stages path:

1. Displacement: It is an event that happened in the economic or political world that created a new paradigm: a new disruptive technology that gets people excited, it could be a fundamental change in the economy like the opening of Russia, which brought to the 1998 bubble, or the decline in the federal funds rate in the 2000, which fuelled cheap funding and huge investments in the housing markets and planted the seeds for the 2008 sub-prime mortgage bubble. It is in this phase that "smart investors" spot changes in industries, markets, countries or economies and start investing in order to extrapolate most of the value.
2. Boom: After the new paradigm, prices rise at first slowly, but then gain momentum as information spreads and more participants enter the market and

try to capture value for them too. At this moment, with social media coverage too, it starts a huge speculation on what could be a lifetime opportunity. The process becomes self-reinforcing as time passes. This idea becomes pandemic and attracts even more people in the market. Usually, one of the main drivers at this moment of a bubble are loose credit and lending.

3. Euphoria: In this phase of the bubble life, asset prices skyrocket, and investors tend to be less risk averse. The commonplace is the "greater fool" theory, which becomes a common belief among investors. Moreover, the process starts to bring even more people in the market as early investors start to generate vigorous gains. Usually, this phase is very short, with prices that rise steeply but also fall sharply without investors having time to close their positions. As everyone starts buying big, after the burst of the bubble everyone starts fire-selling.
4. Profit taking: During this phase every investor starts selling out positions and taking profits. What triggers this phase is an event, even minor, that makes the bubble burst. Once the burst takes place, it cannot be inflated again. Moreover, as investors are shorting and fire selling, there are huge decreases in asset prices and euphoric buying is replaced with panic selling.
5. Panic: In the panic stage, asset prices overshoot their fundamental values and reverse course, descending as fast as they had risen. The market sentiment becomes pessimist and investors, as well as speculators, try to liquidate and close tier positions in order not to lose any more money. Problem in stage arise when the bubble triggers other types of financial/economic crises (e.g., liquidity crisis) (INVESTOPEDIA, sd).

Section 3.02 THE 2000 DOT-COM BUBBLE: AN IN-DEPTH ANALYSIS

By using the Miskyn model, explained in the previous section, the aim will be to analyse within the 5 stages, the 2000 Dot-Com bubble and have a clear overview of how, when and why the bubble occurred:

1. Displacement: Being a commonplace, high abundancy of credit and an economy performing well are the must-have ingredients of a bubble. However, an exogenous shock, which occurs outside of the relevant market, must be investigated. The new paradigm that is being created is what will lay down the perfect conditions for the bubble to inflate. In the case of the Dot-Com bubble, the shock came in at the beginning of the 1990s with three factors:
    a. From 1990 to 1994 the federal reserve began to lower interest rates as a stimulus for the slowdown of the economy due to the Golf War,
    b. In 1992, the Clinton –Gore victory paved the way for 30 billion redirected from Cold War peace to investments in IT infrastructure,
    c. A weakening of legislation restricting investments of commercial banking sector
2. Boom & Euphoria: Already by 1993, due to the huge investments in IT infrastructure by the US government, social media were already spreading out the vision of a high-tech future. The Internet was the new world where big

money was certain. However, it is not until August 1995 that the first IT start-up goes public, Netscape. Netscape, a 1,6-years-old Silicon Valley start-up, which didn't have years of operational experience or proven solid earnings, but had the vision of a prosperous future. Its leading product was Mosaic, a crucial link for people to the Internet, and its future expectations of earnings were the only drivers of investors' attention. This date can be seen as the beginning of the IT boom and Netscape's IPO its starting point. In the first day of trading, Netscape, with an offering price of $ 28 per share, soared to $ 74 and closed at 58$. The demand was so high for its shares that at the end of the day "the Internet gold rush was on". Soon after Netscape's IPO, other IT start-ups began to go public exhibiting skyrocketing stock increases. As it was being advertised also by social media, investing in these IT companies was a "once-in a life time" occasion. By the end of 1995, the Dow-jones industrial average closed with over 30% gain, while technology-heavy Nasdaq closed with a 40% gain in the composite index (GREENSPAN, 2007). Many other companies in the following years continued to go public, like Yahoo, eToys, Amazon. The common approach used for the IPOs between 1996 and 2000 was the "Netscape-like approach". Single day returns of more than 100% made Venture Capitalists and investment banks copy the success of Netscape. Furthermore, with the definition of "New Era" it was justified the exuberance of investors buying shares of these Dot-Com companies in contrast to the normal "wait and see" strategy usually pursued. On December 1996 Alan Greenspan, with reluctance toward the New Era theories, gives the term "irrational exuberance" (Greenspan, 1996) to what is happening in markets

with IT stocks. Unfortunately, even though the market at first starts fire selling shares it then wrongly “corrects” its valuations and incorporates this term as a positive event. As even more people were brought in the euphoria to get rich quickly thanks to these ultra-innovative IT firms that were promising to bring online every aspect of the real world, between 1998 and 2000 ‘‘the Internet sector earned over l000 percent returns on its public equity” (ELI OFEK, 2003). Moreover, in 1999, 446 IT companies went public obtaining a 70 % average first day return. Remarkable is the IPO of theglobe.com in November, as it saw its stock price increase of 700% in a single day.

3. Take the profits: A bubble continues to reinforce as long as new entrants value the current investments lower than what could be earned in the future. This phase is the crucial point in which big money is invested but also the point in which the first signals of a bubble starts showing. It is again another exogenous event that can be spotted as the moment in time in which investors realize that perhaps there could be a bubble: on March 14, 2000 the USA president Bill Clinton, together with UK prime minister Tony Blair, issued a statement that researchers should have free access to the research that maps human genomia (Secretary, 2000). Following this statement, first leaks started to come up that perhaps it will not be entirely achievable to privatize the Internet. Now up to the Internet companies was to proof that their negative cash flows would turn soon positive and generate profits.
4. Panic: However, the Dot-Com companies where not up to the challenge, with the Internet index loosing 19% of its value in April 2000. By the end of the year almost 60% of the equity values of the Dot-Com companies was lost (Qiao

Liu, 2001). More than 800 Internet companies disappeared (Rovenpor, 2004) and the failure in the Internet sector started an overall downward spiral in the entire market. Furthermore, market value of Internet companies that were going through IPOs sharply declined from approximately $1T in March 2000 to $ 572B in December 2000. During the entire 2001 companies continued to disappear and investors were trying to get out of their positions and save what could be saved. The few investors that had anticipated the crush of the bubble made profits due to the high demand of these stocks at the beginning of the 2000. However, many other investors and experts continued to avoid the signals of instability. Stanley Druckenmiller, George Soros' fund manager, replied to the question of why he didn't get out of their positions earlier is the perfect example for what many others did: "We thought it was the eighth inning, and it was the ninth.'' (DILIP ABREU, 2003). By 2002, with the introduction of the Sarbanes-Oxley Act, which regulates auditing processes and disclosures, and with many other investigations by the SEC, the market starts to recover. From march 2000 to October 2002 almost $ 5 trillion were wiped out of the market (Green, 2010).

By analysing the movements in the NASDAQ composite index, the bubble looks even clearer. In Phase I, the displacement and the first smart investors enter the market. In Phase II, the boom, with institutional investors that begin to invest and the bubble starts to grow. In Phase III, is possible to see the last parts of the boom and the beginning of the euphoria phase, with the general public begins to notice and starts to invest. By Phase IV, there is the beginning of the taking profit phase, with the last investors

jumping in, the biggest investments are made and the smarter investors start to move out of the market. The people who are hurt the most are those who remain during the fall, which are often those who invested during the final phases.

Figure 4: Phases of the Dot-Com bubble on the Nasdaq Composite movements

[5]

The last phase is the panic, which occurs after point A until the end of the bubble. In fact, point A is a false boom, with stock prices appear to be rebounding following a significant initial decline. However, after a brief rise, they resume their decline to their ultimate bottom. Finally, at Point B there is a bear trap. Again, after a significant downturn (Point A), the market seems to be rebounding (Point B). This rebound prompts investors to get back in, believing the market is roaring back. After point B the crash is vigorous (PATTON, 2015).

[5] Image taken from (PATTON, 2015)

Article IV. VALUATION MODELS

Valuations are the basis for choosing a company over another one. As seen in sections above, valuations if done wrongly can lead to serious troubles to the economy. In this section it will be analysed the most widely used valuation methods and assessed for each one advantages and disadvantages, as well as the best situation when each model yields the most truthful result.

Section 4.01 THE DISCOUNTED CASH FLOW MODEL

The Discounted Cash Flow (DCF) model is a valuation method used to determine the stock prices of companies. It is considered one of the most robust and solid methods since it uses different sources of input from the company's financial data to estimate the entire worth of the company. It is widely used as the preferred method to compare the resulting stock price with the publicly available trailing stock price of the company. The idea that supports this method is that a stock's value is equal to the sum of the present value of all the company's future cash flows. Thus, the very first step is to estimate all the future cash flows of the company. In the past it was taken the amount of dividend paid as the relative cash flow. However, due to the changes in nature of companies nowadays, which not always pay dividends out, it is used the concept of

free cash flow. Free cash flow is given by operating cash flow minus capital expenditures. Besides, it is important to estimate and take into account the relative profit margins, revenue growth rates, discount rates, perpetuity value, industry trends, economic data, sources of a company's competitive advantage. To obtain the cost of capital it is used the Capital Asset Pricing Model (CAPM)[6] for the only equity cost, while the cost of debt is simply the interest rate of the debt instrument. Instead, when considering a company with both debt and equity, the Weighted Average Cost of Capital (WACC)[7] method.

Lastly, to obtain the perpetuity value of the company, thus the value in the long run of the company, it is estimated a lower and much smoother growth rate and used the Gordon Growth Model. The Gordon Growth Model takes the Free Cash Flow of the first year with a steady growth rate and it divides it by the cost of capital (k) minus the growth rate (g) implied in the steady state:

$$PV = \frac{FCF}{(k - g)}$$

There are essentially two different types of Free Cash Flows that can be used for the DCF model:

1. Free Cash Flow to Equity (FCFE): It is cash that will be available to shareholders after all of the company's expenses are paid out, reinvestments and taxes are paid. It is calculated with the following formula:

[6] $CAPM: k_e = rf + \beta(rm - rf)$ with *rf*= risk free rate, β = company's beta, *rm*= market risk

[7]

$$FCFE = NET\ INCOME - NET\ CAPITAL\ EXPENDITURES$$
$$-CHANGES\ IN\ NET\ WORKING\ CAPITAL$$
$$+NEW\ DEBT - DEBT\ REPAYMEN\square$$

2. Free Cash Flow to the Firm (FCFF): It is a measure of the cash that will be available to bondholders and shareholders of a company after all expenses, changes in networking capital, reinvestments and taxes are deducted. It is calculated with the following formula:

$$FCFF = NET\ INCOME + NON\ CASH\ CHARGES + INTERESTS$$
$$\times (1 - TAX\ RATE) - LONG\ TERM\ INVESTMENTS$$
$$- INVESTMENTS\ IN\ WORKING\ CAPITAL$$

(a) ADVANTAGES AND DISADVANTAGES OF THE DISOCUNTED CASH FLOW MODEL

(i) Advantages

The most sticking advantage is that, if inputs are correct, this method brings us the closest to the company intrinsic value. Another advantage over the other methods of valuation (i.e., multiples) is that the DCF model, using the Free Cash Flow, is free

from arbitrariness and "guesstimates". Another advantage, is that it is possible to use the DCF model backwards, by using the current public stock price and applying it to the model to understand if the current public valuation is over- or under-estimated.

(ii) Disadvantages

One of the main disadvantages of the DCF model is that the output is completely dependent on the quality of the inputs used. If, in calculating the free cash flow, the assumptions and/or growth rates are not correctly estimated, the stock price that is obtained does not provide a truthful valuation. Another problem that is encountered with the DCF model is the assurance that the cash flows will truly continue in the future. In this case, it is up to the estimator's confidence and forward looking capability to be confident that the company will continue to provide cash flows also in the future. Another problem, which is this relative to the way the assumptions are made, is that also a slight change in discount rates or in the growth rates can alter substantially the final valuation. The last problem is that usually it is taken for granted that an estimation of the company valuation done with the DCF model will be the same constantly. However, due to the high number of variables used and assumptions done, it is mandatory to update the inputs of the model as often as the exogenous economic conditions change.

Section 4.02 THE MULTIPLES' VALUATION MODEL

Multiples valuation model can be considered as the most frequent and straightforward measure of equity valuation used. Valuation multiples are used as an expression of the market value of a key statistic that is assumed to be a good proxy for the stock value. When choosing the parameter to be used, it must be assessed the logical relationship with the market value observed. In essence, it is a method of analysis of equity based on estimating the value of the target company with how the market prices of comparable companies or even comparable transactions. For private companies, this method is used by searching in the market similar peers (companies) that resemble the target company in terms of operating and financial characteristics, industry and business scope/lifecycle. The rationale behind this method of valuation is the "Low of One Price", which states that in an efficient market similar assets should be traded at similar prices (Schreiner, Equity Valuation Using Multiples: An Empirical Investigation).

It is possible to find two different types of multiples:

1. Enterprise multiples: Enterprise multiples represent the total value of the enterprise (equity and debt combined) over to a financial statistic that is related to the entire enterprise operations. Thus, in the numerator there is the

Enterprise value (EV), while at the denominator there is the operating financial parameter. The most used ones are:

- $\frac{\text{EV}}{\text{EBITDA}}$ Multiple – It shows the value of the overall company, with equity and debt combined, but it is biased by accounting treatments.
- $\frac{\text{EV}}{\text{SALES}}$ Multiple – Crude valuation measure, but least susceptible to accounting differences since sales is an operating parameter that is not influenced by different accounting principles.
- $\frac{\text{EV}}{\text{EBIT}}$Multiple – Used mostly when there are capital intensive expenses that differ between the companies.
- $\frac{\text{EV}}{\text{FCF}}$ Multiple – Mostly used to compare peers within the same sector.
- $\frac{\text{EV}}{\text{CAPACITY}}$ or $\frac{\text{EV}}{\text{units of product produced or revenue}-\text{generating unit}}$

  (Vaidya, 2014).

2. Equity multiples: Equity multiples represent the total value of shareholders in a firm, thus their claim on the company's cash flows over financial parameters that are related to equity. On the numerator there is the equity value of a single share of the company, while as the denominator there is a financial equity parameter of the company. The most used are:

- $\frac{\text{P}}{\text{E}}$ Multiple – It shows the amount of years of the company's earnings will take to repay the price paid for the share. A lower PE ratio is favourable all else being equal and considering the same sector.

- $\frac{P}{CF}$ Multiple – It measures the future financial health of the firm excluding depreciation and other non-cash parameters.
- $\frac{P}{BV}$ Multiple – Useful when the value generation of the companies are tangible assets. It is useful to compare also the ROE (Return On Equity) in these cases since $\frac{P}{BV}$ is also equal to $\frac{P}{E} \times ROE$[8]
- $\frac{P}{S}$ Multiple – It can be very useful when the companies don't have positive cash flows, thus negative earnings, like start-ups.
- PEG Multiple – Used to show the stock's value while also considering the earnings growth.
- For Internet companies is possible to use also Price/subscribers, Price/pages visited and price/inhabitants (FERNANDEZ, 2004).

(a) ADVANTAGES AND DISADVANTAGES OF MULTIPLES' VALUATION MODEL

(i) Advantages

The main advantage of the Multiples method is essentially its simplicity in using it and their availability in many newspapers. Moreover, it needs less inputs and assumptions to derive the final value. Lastly, it gives information that are easy to understand and shareable (Peter Suozzo, 2001).

[8] $ROE = \frac{NET\ INCOME}{EQUITY}$

(ii) Disadvantages

It is possible to find six main disadvantages in this method. Firstly, it takes into consideration peers that will never be 100% equal to the target company. The second disadvantage stems from the first one, being the method too simplistic to base the valuation of a company. Thirdly, multiples are snapshots of where the companies are now, thus being short sighted about the future of the companies. Fourthly, when comparing company A with B, is not always possible to consider A a peer of B if we are evaluating the value of B. Fifthly, as already anticipated above for some multiples, are the accounting treatments that differ among countries that could influence the output of the multiples method. Last but not least, market values are highly biased by the market sentiment, thus a bearish market will lead to results that differ from a bullish market (Schreiner, Equity Valuation Using Multiples: An Empirical Investigation, 2007).

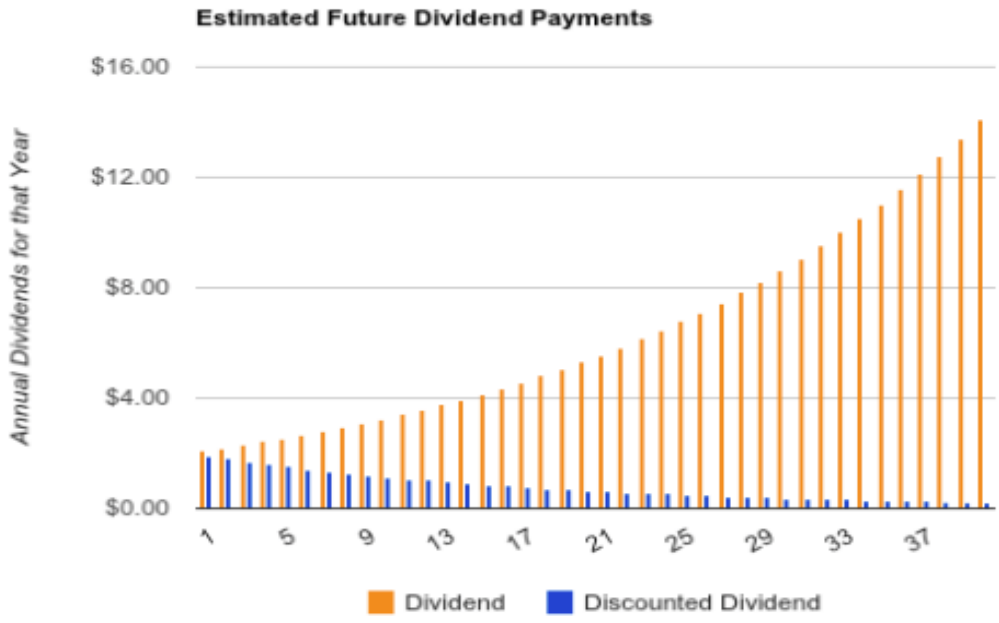
Section 4.03 THE DIVIDEND DISCOUNT MODEL - GORDON GROWTH MODEL

The Dividend Discount Model (DDM) is a method of valuing the price of shares of a company by calculating and forecasting in the future the dividends that the company will pay out to its shareholders and then discount them back to the present. It is also known as the Gordon growth model as it assumes that the payments will continue for perpetuity:

$$STOCK\ PRICE = \frac{DIVIDEND_0 \times (1+g)}{(k-g)}$$

The DDM can be also modified by applying multi-step growth rates for *x* number of years and a lower and smoother growth rate for the long run. It applies here the same concept of the DCF model to discount backwards future cash flows.

Figure 5: Dividend payments weighted with the "Time Value of Money" concept



[9]

[9] Image taken from (Dividend Monk, sd)

(a) ADVANTAGES AND DISADVANTAGES OF THE DIVIDEND DISCOUNT MODEL

(i) Advantages

It is the easiest method that takes into account time value of money to value the stock price and one of the easiest to understand. It takes into consideration both cost of equity and growth rate by discounting next year cash flows (given by present cash flow multiplied by the chosen growth rate) to the present, interpreting as a perpetuity. Moreover, by not taking into account market conditions, like multiples are subject to, is easier to use among companies within different industries.

(ii) Disadvantages

The DDM has many drawbacks that make it too simplistic in many cases. It doesn't take into account non dividend factors such as customer retention and intangible assets' ownership. Moreover, it is based on the assumption that dividends of a firm will continue forever and that they will grow at a definite rate for the time being. Moreover, it is highly dependent on the magnitude of the dividend paid out by the firm that is being used. Lastly, it has the restriction that growth rates used must be always lower than the cost of equity, thus the k in the denominator of the equitation. This condition in the years could not be always met, with the growth that could also be higher that the discount rate. However, this condition is not taken into account by the model. For the purpose of this paper, this model cannot be taken into consideration for

the fact that growth stocks, like the majority of high tech start-ups, do not pay out dividends until they enter the stage of income stocks.

Article V. UNICORNS: ECONOMICS, GROWTH AND VALUATION

It has been put a lot of emphasis lately by the economic world on technology companies with high valuations, also called Unicorns. The term "Unicorn" has been drafted for the first time by the Venture Capitalist Aileen Lee, founder of Cowboy VC, and early stage Venture Capitalist. With this term she initially meant that finding a company that being a start-up was valued so heavily was as rare as finding a Unicorn. For the purpose of this paper, it will be analysed the economics behind Unicorns, how they grow and the how they are assigned valuations.

Section 5.01 UNICORNS: WHAT ARE THEY?

Unicorns are IT-centric companies with a focus on software offering, but also hardware in some cases (e.g., Xiaomi). These companies are usually young companies that operate globally, or in more than one country, by offering innovative services to customers whose demand has not been met by the current market players. These new demands arise from the current Internet mobile wave and these companies, in order to satisfy these needs, rely on connectivity infrastructures, new devices and the combined

opportunities that arise from the two. These companies are based on economies of scale and scope as well as, and to a large part, network effects. For these companies to operate they must rely on a favourable business environment and on fast growing market niches and customer segments. As they serve untargeted customers and market niches, they are also disruptive for other industries that until now have distributed their products in other conventional ways. Moreover, these Unicorns are Venture Capital-dependent and as it will be analysed later on this paper, there is a tremendous competition on investing in these companies. This extreme competition is bringing to extreme valuations, which will be further analysed in this paper as a possible market bubble.

Actually, it has not been until 2009 that the first Unicorn showed up in the financial world, with one high tech start-up that reached a stock market valuation or estimated valuation of $ 1B. From 2009 onwards, due to a bullish private market and due to the emergence of disruptive technologies, it is possible to identify many more cases. Moreover, over these years it has also been acknowledged the existence of "Decacorns". Decacorns are start-ups that have surpassed the $ 10B valuation, thus being considered to have more than one corn; with each corn representing in this definition a $ 1B valuation. As it will be explained more in depth onwards in this paper, Unicorns now are much more common than what it is thought. A note has to be made for clearance, as the real first Super-Unicorn, a company that has surpassed the $ 100B valuation, is Google Inc. from the 1990s, while for the 2000s the first and only super Unicorn is Facebook. However, being both already quoted in the stock markets, they are not the main focus of this paper. It is extremely important to stress the $ 1B threshold as the majority of the current Unicorns are private and funded by investment

funds that usually search for profit opportunities at exit. However, with such high valuation the exit that they are considering is something close to abnormal returns. The common traits among these high tech companies are the following:

1. The funders are often serial entrepreneurs, who have already started other businesses in the past (eg., Xiaomi, Uber)
2. Most of these companies grow organically, with the amount of funds required varying based on the strategy adopted. Instead, others grow inorganically and usually require a higher level of funding in order to acquire several targets.
3. Almost all of the Unicorns rely on Venture Capital funds for their beginning, development and exit.
4. Many of these Unicorns have high R&D expenditures (Simon, 2016).

As already explained above, these start-ups, due to their flexible nature in adapting and satisfying demand that it not currently served, are able to pose a threat to current market leaders and participants. However, demand is a concept that is extremely difficult to capture. As Henry Ford, creator of the Ford Motor company, once said "If I had asked people what they wanted, they would have said faster horses." (Vlaskovits, 2011). In this view, demand arises from innovative ideas of companies for which customers would have never thought about. However, these innovative ideas are generated from the technological progress in which the world is in. Currently, the society is entering the third Internet wave. The first wave was about building the Internet and its underlying infrastructure, dating from 1980 to the early 2000. The second wave started off around the beginning of the 2000, as the first wave was slowly

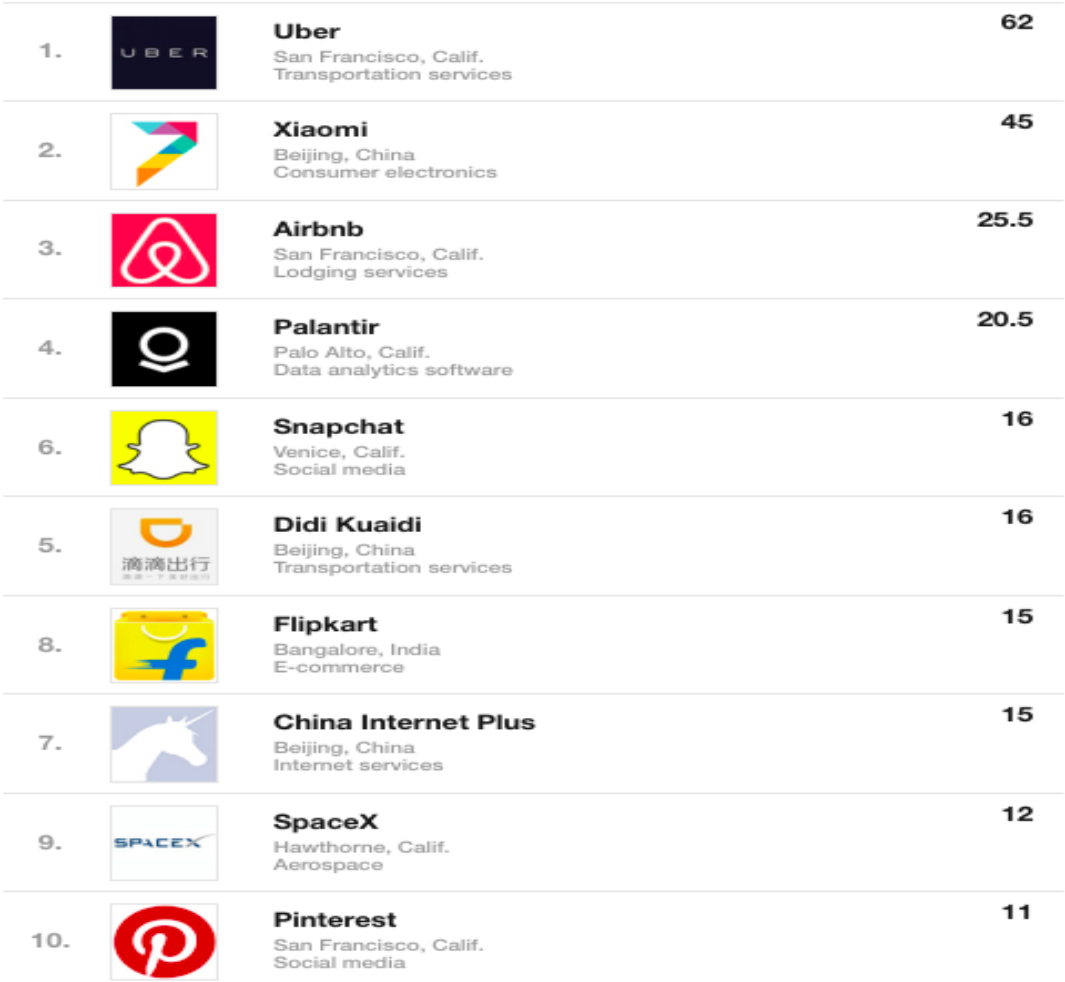
ending, and was about creating the programs, apps and services that now make up the content of the Internet. The second wave has been able to connect people not only for work but also for social and playful purposes. Even though the limit from one wave to another cannot be showed with precision, the third wave has already begun few years ago. The third wave is about on bringing on the Internet everything that is still left out, also called "The Internet of things" (IoT).

With the IoT it will be possible for objects to connect and interact with each other and provide a totally different type of information and access to knowledge. In fact, the IoT represents a substantial evolution of the Internet, maximising its capacity to gather, analyse and assign that can be transformed easily in knowledge. Therefore, IoT can be considered the very first radical evolution of the Internet and its structure. Likely, with the third Internet wave, it will be possible to observe an increasing number in the next years of high tech start-ups that could realistically become Unicorns.

As just said above, with tech Unicorns not being anymore a rarity, it is possible to identify 200+ Unicorns currently in the economic world. Below it is possible to observe the first 10 Unicorns, from a list made by fortune economic newspaper of all the Unicorns now in the market. On the left is possible to observe their current valuation. All these companies are still private, meaning that they still didn't have access to the liquidity of public markets. With no surprise, the majority of these companies are from the USA, some from China and only one from India. Moreover, more than 2/3 of these companies are software companies: Uber and Didi Kuaidi are the largest taxi services in the world, but neither of the two owns a single taxi. Airbnb is the largest house renting company in the world, but still it doesn't own any house.

Only few of them, like Xiaomi or Space X are companies that have their core business in ownership of tangible assets.

Figure 6: Top-10 Unicorns' list with respective valuation in billions ($)



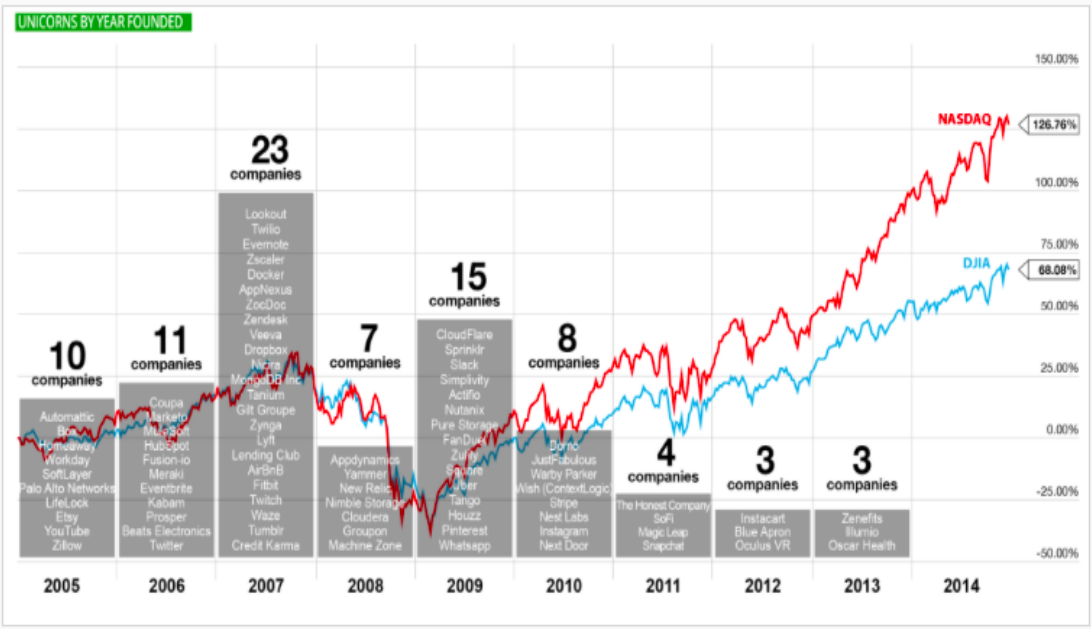
[10]

All being said, between 2003 and 2013, there has been an average of 8 Unicorns born per year, with 11 Decacorns currently in the private market. There are no Super-corns currently, as the only two ever existing are already quoted (i.e., Google, Facebook).

[10] Image taken from (FORTUNE, 2016)

Moreover, most Unicorns are consumer driven companies that shape their business around service offerings to customers. These companies are also the ones that growth faster and that rise most of the capital. It has been seen that e-commerce companies are the ones that have the lowest capital efficiency among the tech Unicorns, meaning that in the future these companies might affect significantly the returns for investors (Lee, 2015)

Figure 7: Correlation between NASDAQ and Dow Jones yearly fluctuations and the creation of Unicorns



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In the graph above, is possible to observe the floating of the Nasdaq and Dow Jones between 2005 and 2014 and for each year the number of Unicorns that have been launched. The most prolific years are 2007 and 2009. It is not a case that these years

[11] Image taken from (Lee, 2015)

are the starting point for many current Unicorns: in 2007, there was the housing bubble almost at its verge, but the market was still very euphoric. However, the most important event was the release of the iPhone, which opened new prospect markets. Instead in 2009, which was the lowest point in time in the last decade for the indexes, was the period in which Android was launched in the market. Also in this case, as explained above, with the fact that the housing bubble did affect the private market, but not heavily the tech sector, it can be seen that market sentiment didn't affect the creation of new high tech Unicorns. It can be stated that "the best deals are done when the market is down" as good money goes only to good ideas. Moreover, at each introduction of a water shade technology there is, in the following months, the born of a high number of start-ups.

Interesting to notice that the majority of thee Unicorns are competing in submarkets that are guided by the "winner-takes-it-all" condition like Uber and Didi Kuaidi in the Chinese taxi market. After many years of competition, Uber agreed to exit the Chinese market and pass on all of its infrastructures in China to Didi Kuaidi in exchange of ownership in it. Another example is Snapchat, being the mostly widely used app for mobile devices of its kind, it has the complete market due to platform and first mover advantages.

What has been said by many lately is that these companies are being overvalued by private investors, mostly with shifts in funding of private equity market in the later stages of investment rounds. What will be addressed in the following section is an analysis of the public markets, indexes and IPOs of some Unicorns that in the past years went public.

Section 5.02 PUBLIC MARKETS' SENTIMENT AND A STUDY-CASE EXAMPLE OF UNICORNS' IPO

In the 2000 what has been observed by investor was a public financial bubble that when bursted affected the entire financial system. At the beginning of 1998, valuations of high-tech companies were 40 % higher than the general market valuations. It is not until 2000 that these valuations reached a peak of 165%. However, even at this point in time the highest valued high tech company barely reached a valuation of $ 6B when it was taken to the IPO. In today's numbers these are nothing special. As already observed above, there are over 100 companies that can be recognized as companies with a valuation above $ 1B and the most valued Decacorn has reached a valuation of almost $ 70B. However, by looking at the market conditions, it is possible to spot differences between today and 16 years ago. The market today in any way is not overvaluing high tech companies like it wrongly did during the Dot-Com bubble. In 2015, the aggregate valuation of floating high tech companies, in line with the rest of the market, was around 20 times their earnings and has been stable since 2010, with only 10 % higher than the valuations of the rest of the market participants. Currently, these market conditions are not ordinary as these valuations are among the lowest for what has been seen over the years. On historical trends, high tech companies' valuation has averaged a 25 % valuation premium over the other companies.

Figure 8: Price-to-earnings multiple floatation between Global technology market and Global Market

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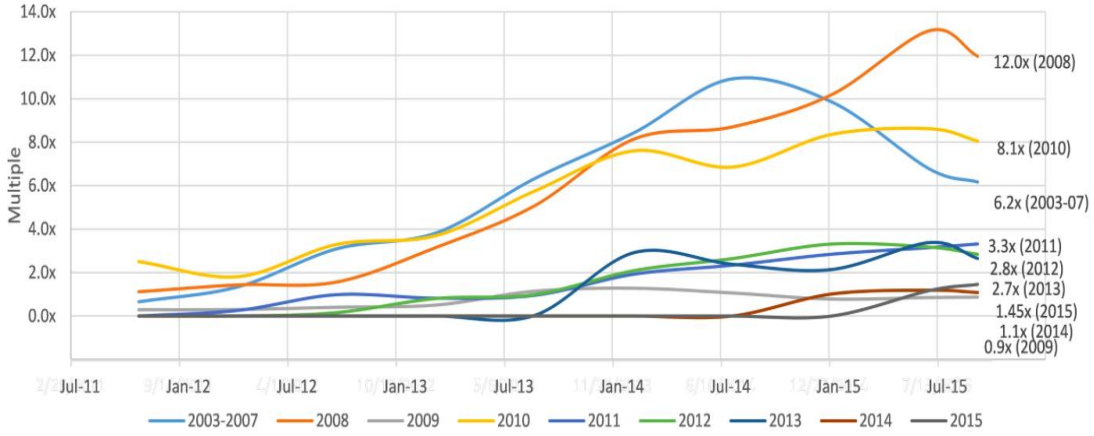
Besides, as also shown by the above graph, current valuations of high-tech public companies are in line with the general market globally. Excluding the 2000 Dot-Com bubble years, since 2011 the valuations between the two market have been closely floating. However, the pragmatism and the financial metrics that have been applied so far in public financial markets are totally different from what is being done in private markets. The discrepancy between the two markets is creating another precedent for what could be a loss in the long run of value for investors. What is being observed in the private equity market are skyrocketing valuations, with high tech Unicorns that reach their spike in valuation before even going public, at the pre-IPO stage. The result is a decrease in stock price after the IPO process. It has been observed that after 2009 it took on average for a new high tech start-up 18 months to become a Unicorn and

[12] Image taken from (MCKINSEY & COMPANY, The 'tech bubble' puzzle, 2016)

rise more than $ 1B of funds in the private markets (MCKINSEY & COMPANY, The 'tech bubble' puzzle, 2016). The precedent that is being created here is one that goes behind the conceptual framework of the private equity investment concepts: usually investment in private companies had the objective to increase their value and at the end of the time span, usually 5 years, in which private investors held these companies, up to an exit opportunity to cash on these companies. In other words, there had to be an upside that these investors could realize over their investments. By analysing the US tech companies that have gone public since 2011 with their pre IPO funding stages, it is possible to observe how this upside has been shrinking over the years.

Figure 9: Hypothetical Pre-IPO stock performance by private investment year



[13]

By comparing the market capitalization of these high tech companies in 2015 that went public from 2011 with their pre IPO funding stages, which some date back also in 2003, it has been possible to observe how these stocks are performing. From the above graph, it is possible to observe on the y-axis the multiples that are trading these

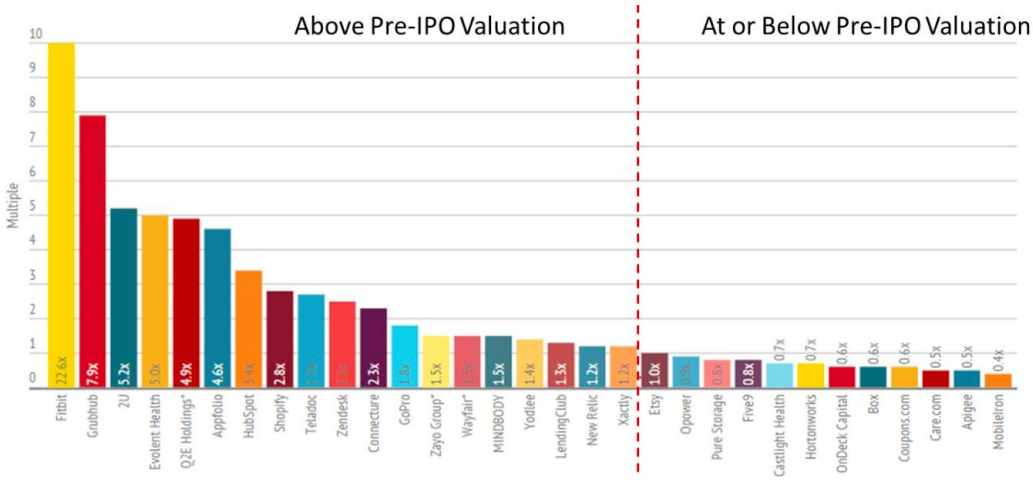
[13] Image taken from (RAVICHANDRAN, 2015)

companies over time (x-axis). The colour lines represent the year in which these companies went through their last pre IPO funding stages. As is possible to observe, companies that received pre IPO funding in 2008 and 2010 are now trading at multiples in a range of 10-12x. These companies, especially the ones in 2008, due to the financial crisis received less pre IPO funding (in 2008 the average was $ 273Magainst the $ 1B in 2013), thus begun floating at lower valuations. As the economy recovered, investors were able to see an appreciation in their investment and a big upside. Among the 2008 companies it is possible to find Imperva, Veeva, Trulia, Tableau, and Palo Alto Networks. Instead, the main top performers of the 2010 companies are LinkedIn, Proofpoint, Fusion-io, Demandware, and EPAM Systems, which are now trading at high multiples. Instead, the companies of 2003-2007 have been averaging around 6.2x on their valuations. The worst performing year has been 2009, at the peak of the 2008 financial crisis, with 0,9x on average on their pre-IPO valuation.

By observing the 2011-2013 companies is possible to observe that the upside is already shrinking significantly. Pre-IPO investment in these companies gave to the investors after the IPO a valuation ranging between 2,6x and 3,3x. However, compared to the 2008-2010 values, there is a substantial difference, with the trading multiples in those years of 8.1x-12.0x. This means that at the moment of the last funding, the private equity market was already valuing more aggressively these companies, leaving a lower upside to investors. Evidence can be found even more clearly in the 2014 and 2015 companies. Companies among Etsy, OnDeck, LendingClub, New Relic, Box, and Hortonworks after their IPO traded at multiples of 1.1x on average. At this moment it

is possible to state that the private equity market has been already giving skyrocketing valuations since an exit gain for private investors with IPO of 0,1x is extremely low. By plotting the late stage performance of these stocks on the pre-IPO funding stages, it is possible to observe that almost 40% of the companies in 2015 were trading at valuations lower than their pre IPO one.

Figure 10: Pre-IPO stock performance to date for 2014 and 2015 IPOs



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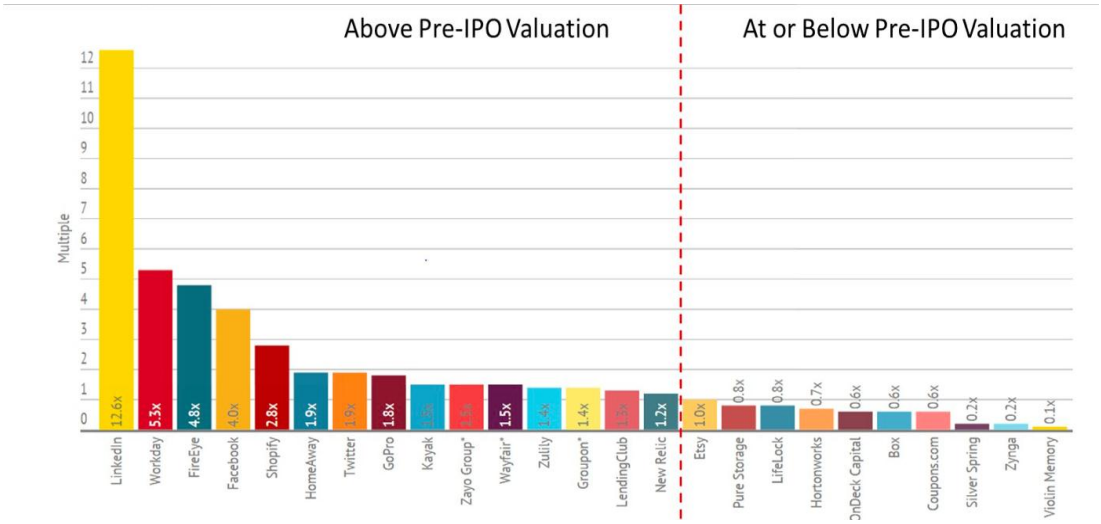
Moreover, the median increase in valuation for investors based on companies' market valuation in 2015 was at 1,4x, 0,3x lower than the increase of Nasdaq in 2013 of 1,7x. By considering only high tech companies that were already Unicorns during the pre IPO process is still possible to observe the same results and the winners are LinkedIn, Workday, Fireye and Facebook.

[14] Image taken from (RAVICHANDRAN, 2015)

Figure 11: Unicorn Pre-IPO to current stock performance



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From the above data, it is clear that a high valuation of Unicorns in the private market leads to lower upside gain for investors after IPOs. The more a company is valued in the private market, the more mixed are the possibilities to have an even higher valuation in public markets. What it seems, is that the metrics that are being used in private markets for valuing these companies are different from the ones that public markets use, otherwise it should be possible to observe skyrocketing valuations also in the public markets for these companies (RAVICHANDRAN, 2015).

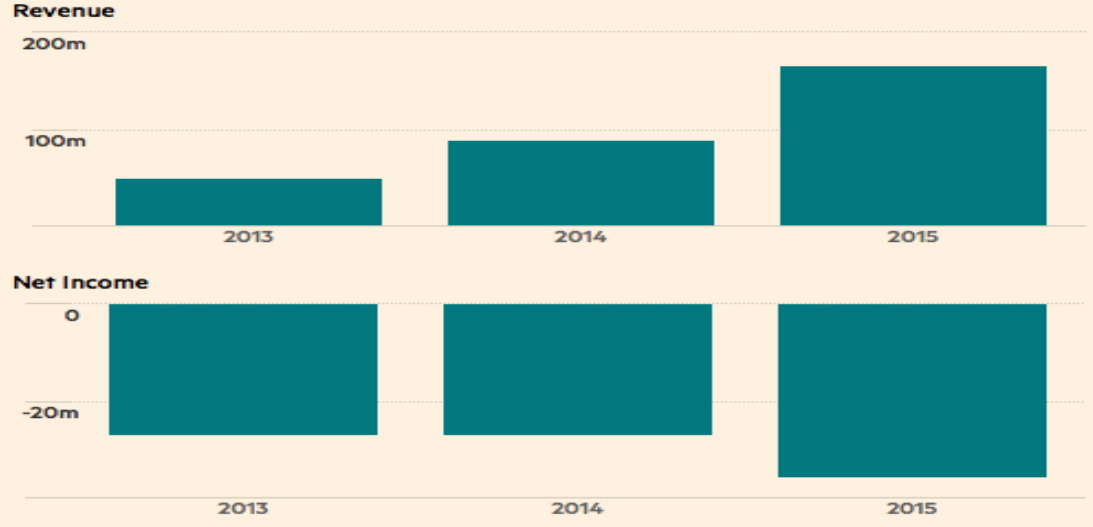
For 2016, it is possible to spot two IPOs that are opposite in outcome, but both regarding high tech Unicorns that went public in the summer 2016: Twilio and Line Corp. The former is a US high-tech company that offers cloud communication platforms to developers in order to build, scale and operate communication within

[15] Image taken from (RAVICHANDRAN, 2015)

software in real time, while the latter, a Japanese high tech company, born after the 2011 Japan's earthquake, offers a social platform and Facebook-like messaging features. The way the two companies differ is on how their current stock price is floating, taking into consideration obviously the higher level of volatility that in the summer periods occur in the financial markets. Furthermore, the two companies vary in business nature, since Twilio is an infrastructure provider (IaaS), while Line Corp is a social network provider. However, it is also true that these factors can influence marginally the floating of the stocks, and as it will be shown below.

First of all, these two companies still didn't show positive earnings as of one year. Actually, Twilio still didn't turn profitable, but is considered to have solid cash flows for the future, as also possible to see in the right graph below.

Figure 12: Twilio 2013-2015 Revenues & Net income



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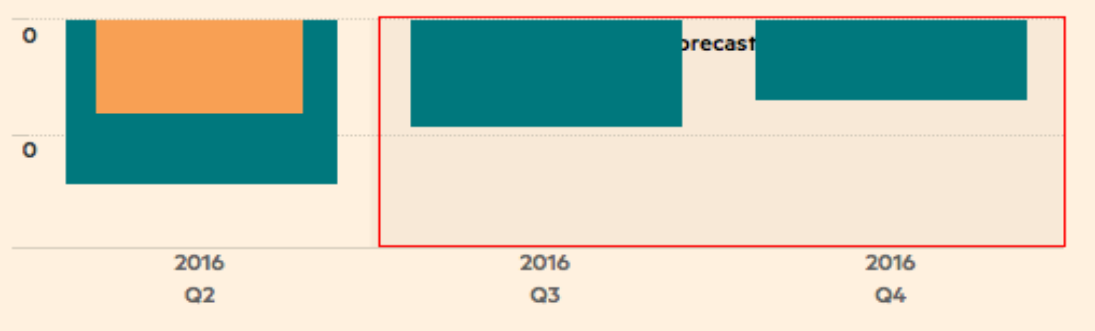
[16] Image taken from (TIMES, 2016)

In the graph below are shown the current earnings and forecasts for the next quarters. Coloured in orange the earnings per stock reported by Twilio in the 2nd quarter of 2016, while in green inside the red box the forecasts for the same period and for the following quarters.

Figure 13: Twilio Earnings' Forecast

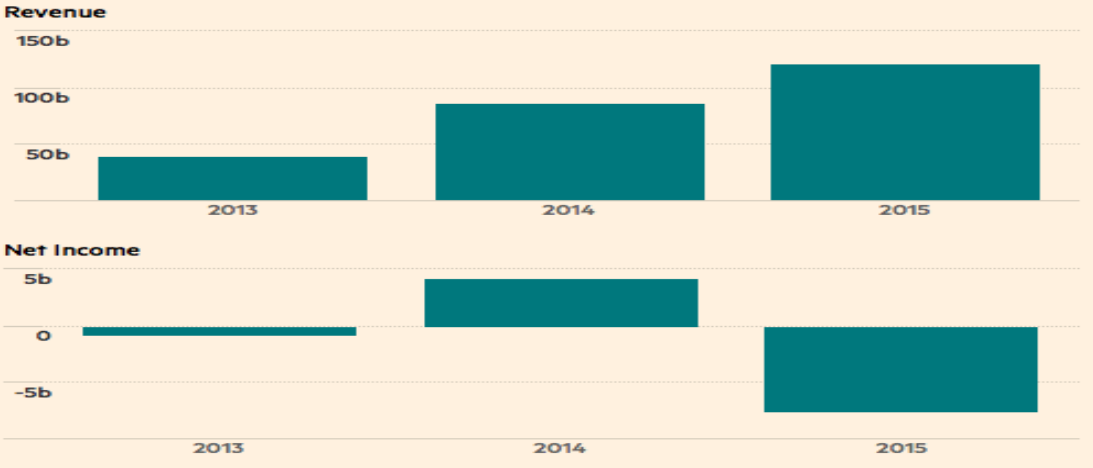


[17]

Instead, Line Corp has showed in 2014 positive earning, but from 2015 to the present, they have turned negative again. It must be said that the decrease in net income has been also due to an increase in selling, operating and administrative expenses that saw a percentage increase over sales from 27% to 39%. From the graph below is possible to spot the change in profitability, but also the increase in gross revenues from 2013 to 2015.

[17] Image taken from (TIMES, FINANCIAL TIMES, 2016)

Figure 14: Line Corp 2013-2015 Revenues & Net income



18

By looking at the IPO day and the current trading, Twilio, which had its IPO on June 23, 2016 is now performing strongly on the market. On the IPO day the stock, which opened at $ 15,00 on the NYSE, saw an increase of 90%, with a 60% increase at the moment of opening to $ 23,99, closing at $ 28,53.

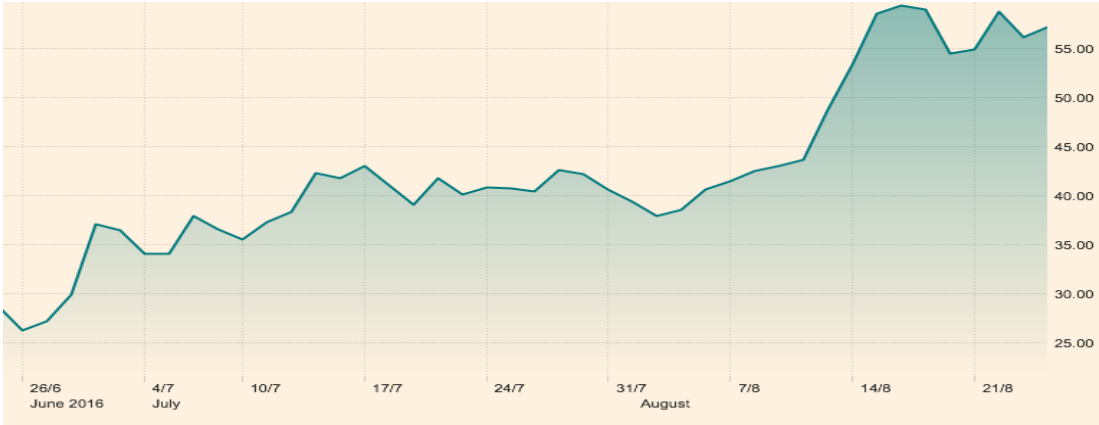
[18] Image taken from (TIMES, 2016)

Figure 15: Twilio's first day of trading

19

As of today, Twilio is trading at $ 57,18, almost 270% above its opening price and a growing interest from the market.

Figure 16: Twilio's stock trading



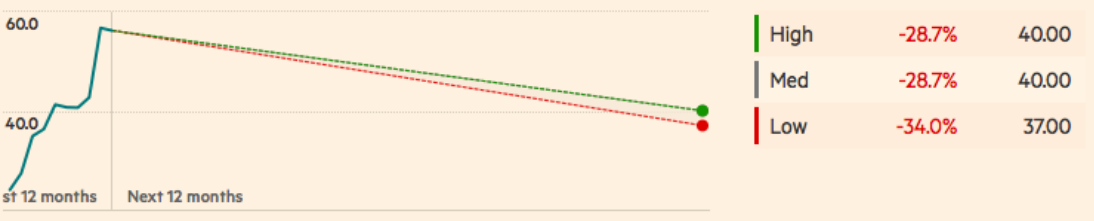
20

[19] Image taken from (Truong, 2016)

[20] Image taken from (TIMES, FINANCIAL TIMES, 2016)

By looking at financial analyst forecasts, the consensus is to hold. However, forecasts for the following months show a decrease in the stock price, with a median at 40$ per share. This also confirms the price range in which Twilio has been floating from the beginning of July to the beginning of August, before an increase in price up to 57 $ per share (Truong, 2016).

Figure 17: Twilio stock trading forecast



[21]

By looking instead at Line Corp's IPO, it has raised on its first opening almost $ 1.1B, which is still below expectations, thus of $ 13B in 2015 and $ 4B to $ 5B during the first months of 2016. On July 14, 2016 Line Corp went public with an opening price of $ 32,50, and the first day closed at $ 41,55 with a 26,52% increase. However, after almost one month, the stock has performed poorly with respect to its first closing day.

[21] Image taken from (TIMES, FINANCIAL TIMES, 2016)

Figure 18: Line Corp stock trading

22

It is currently trading at $ 42,70, with the stock price falling from the peak of August 15, 2016. Considering the current stock price, the increase over the first day closing is relatively poor, without mentioning the month of July in which its price went as low as $ 36,01 on July 29, 2016.

The take-home from the first months of trading of these two Unicorns is quite straightforward. Twilio has showed positive signals and strong appreciation by the market for its business. From the IPO success, it seems that the IPO price was below the real price that investors were willing to pay, leaving some money on the table, and the upside has been solid. On the other hand, Line Corp has showed weak signs on the market with mixed signals from investors' appetite, mostly concerned on the difficulties in expanding its business in other Asian countries and in the USA. Moreover, the opening price at IPO seems to have left too little money on the table for investors and this is also why the stock is trading so closely to the first day closing price. However, another interpretation, even though it is still too early to say with

[22] Image taken from (TIMES, FINANCIAL TIMES, 2016)

100% confidence, it could be as well that while Twilio is a winning Unicorn that was valued roughly $ 1.2B before IPO and now its valuation is around $ 2.8B, Line Corp was overvalued in the private market, leaving little space for exit gains by investors. As data shows, during the last 2-3 years high tech start-ups have received sky rocketing valuations in the private equity market, reducing the upside for investors during their exit from the companies. What will be analysed further in the paper are the reasons behind these high valuations and different ways to value young high tech companies, thus Unicorns.

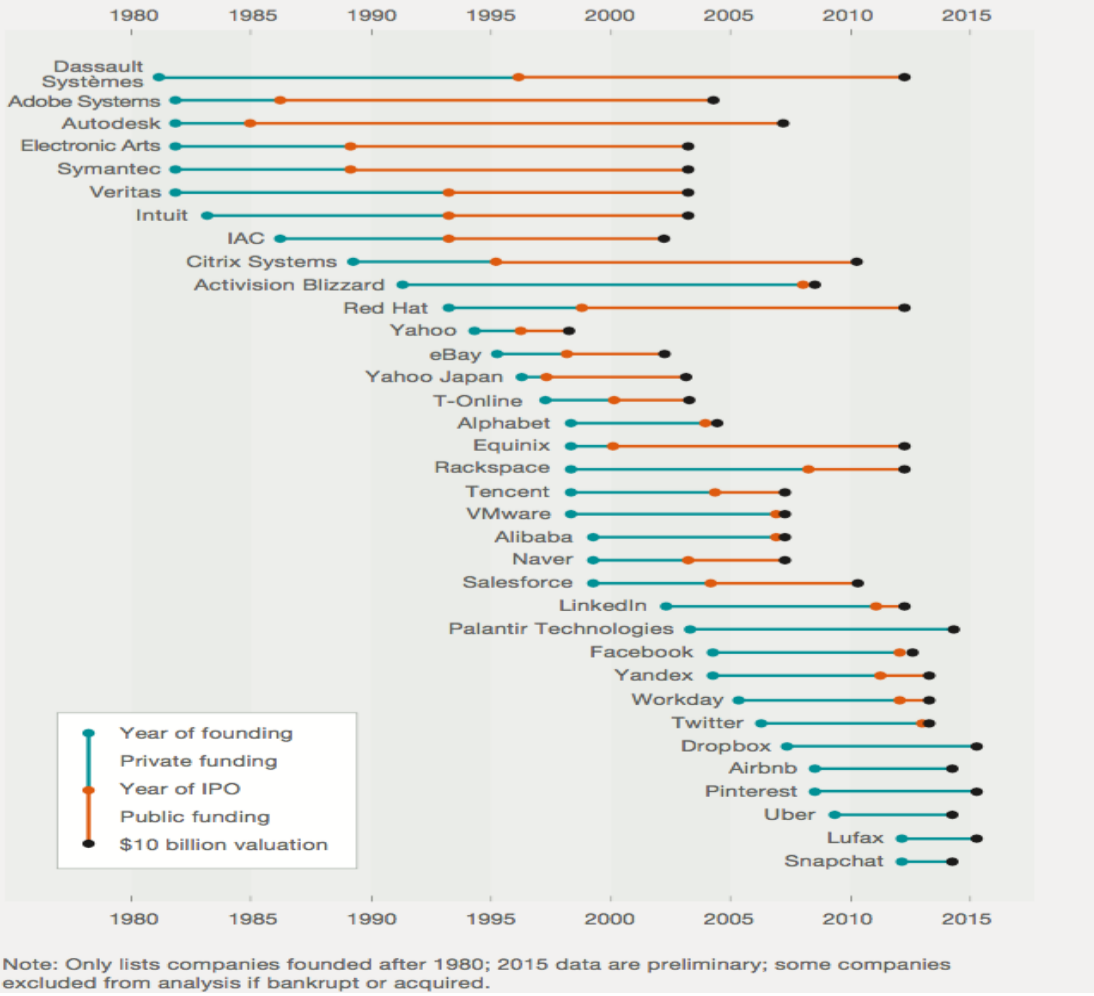
Section 5.03 IS ANOTHER TECH BUBBLE APPROACHING?

It is on the mouth of many people in the financial world that what it is being observed now in the private market could possibly be another tech bubble, like the one that occurred at the beginning of the last decade. The Dot-Com bubble has given a severe hit to the global economy and markets seem to have learned from it, and as it has been said above, technology companies are now trading slightly below average historical valuations. However, there seems to be a mismatch between the mechanism that first fuels the growth of companies in their early years up to the point that they are ready to float in public markets.

What has been observed since 2010 has been an increase in the number of pre-IPO funding rounds for private companies, with the average size of these investments that has more than doubled between 2013 and 2015. A major concept that must be taken

into account at this moment is that economy has become global at almost every level. If in the 2000s only USA was the leading world economy, now also China is strongly taking its position at the top rows. What this means is that there has been an increase in the circulation of money, an increase in competition and opening of new markets (mostly in China) that have proofed to be as large as the western markets combined in some cases. Hence, in the last years it has not be uncommon to see Chinese companies reach skyrocketing valuations, with valuations' increases for these companies up to 5 times in a single year. What comes out from this scenario is that there is plenty of cash that is searching for investment opportunities in a bullish way, flooding with cash any potentially profitable business opportunity. The amount of uninvested but committed funds in the technology industry globally surpassed $ 100B in 2012 and in 2015 surpassed $ 150B, the highest level ever. What has fuelled this abundancy of cash has been also the entrance in private markets of new types of investor (institutional and wealthy individuals) that have been mainly interested in the later stages of funding of these companies - closer to the IPO or exit stage. Given the high level of funds provided by these new investors, now Unicorns are staying private more than before, precisely on average three times longer. In 1999, the average age of US tech companies that went public was of 4 years according to Jay Ritter, a professor at the University of Florida who is specialized in public markets. Between 2004 and 2015 of the 35 companies that reached and surpassed the 10bln valuation threshold, only 6 achieved this valuation level before going public. For the others it took on average 8 years post IPO. What is being observed now is that, high tech companies are increasingly reaching $ 10B and over of valuation without the need to go private, as also noticeable from the graph below.

Figure 19: Time needed for Unicorns to reach $ 10B valuation



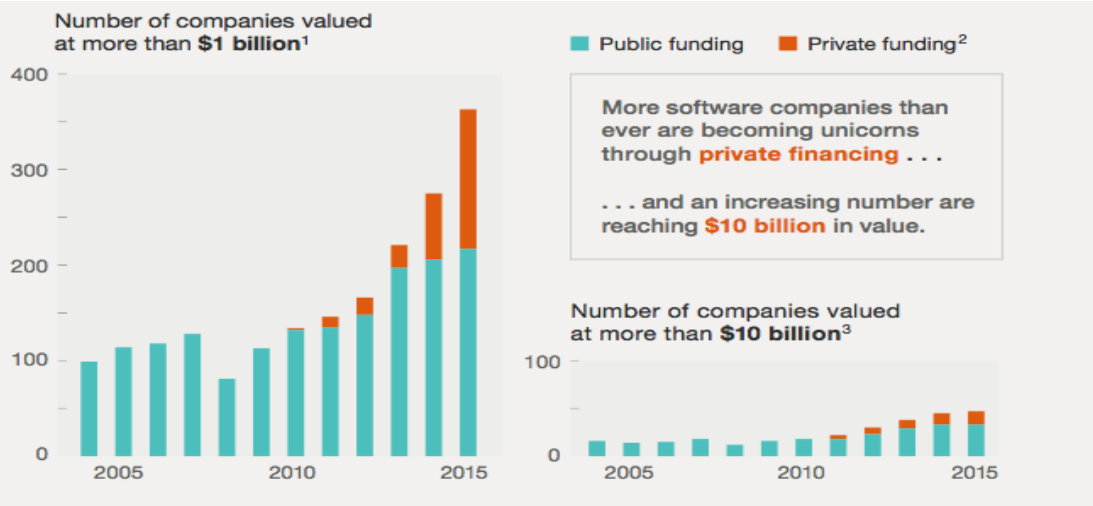
[23]

Currently, high tech start-ups are at least waiting to have accounting profits. Between 2001 and 2008 fewer than 10% are the IPOs made after that a company had reached profitability. By 2010 almost 50% of the companies had at least reached the break-even point for profits/expenses. Actually, the number of high tech companies going public has remained stable since the 1990s, but the capitalization size at the IPO time has more than doubled. In 2014 the average number of years for tech companies to go

[23] Image taken from (MCKINSEY & COMPANY, Grow fast or die slow: Why Unicorns are staying private, 2016)

public was 11 years, with a cumulative amount of financing rounds that are generating an increasing number of Unicorns and Decacorns.

Figure 20: Evolution of number of companies that reach $ 1B and $ 10B valuation



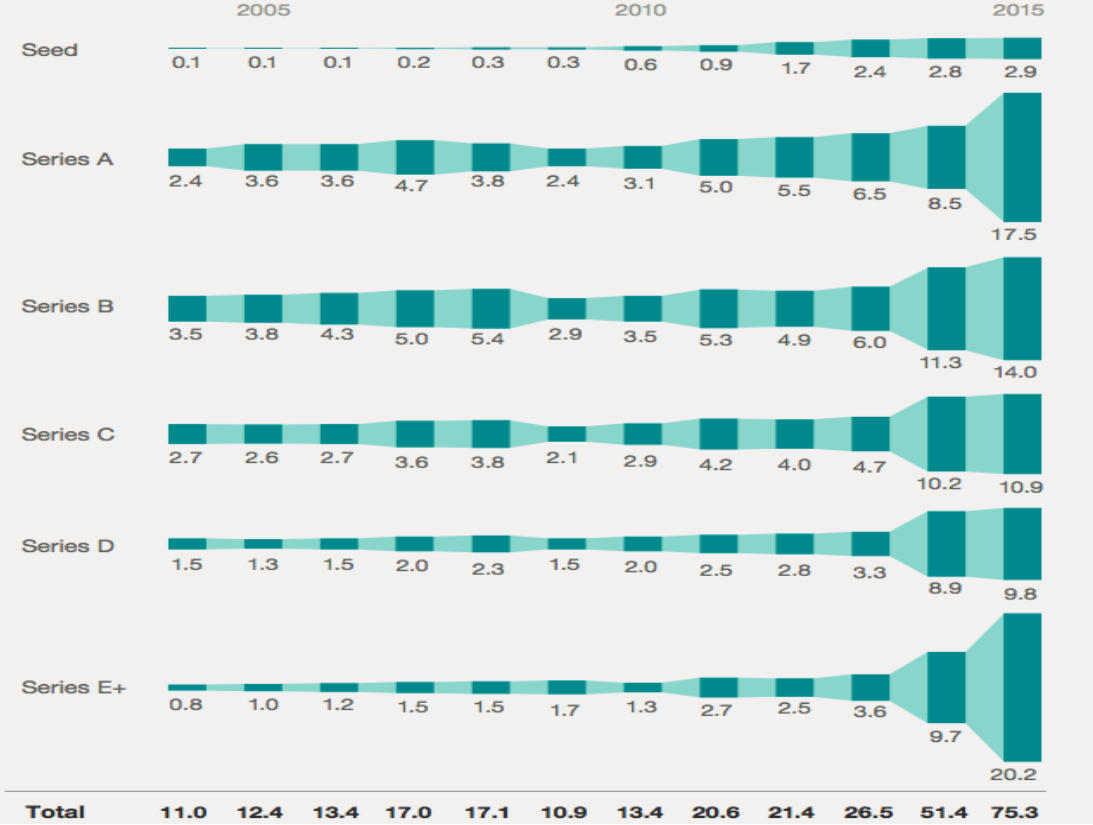
[24]

One of the reasons for the longer period that these companies remain private is also due to new policies that have been enacted especially in the USA: the US Jumpstart our Business Start-ups (JOBS) Act. It passed in 2012 as a new law and it increased by four times the number of shareholders that a company can have before it has to disclose its financial statements. Furthermore, since 2013 the capital invested in tech companies in the private market has increased drastically from $ 26Bto $ 75B in 2015. From the graph below is possible to observe the variation in capital invested from 2005 to 2015 for each of the series of Venture Capital funds that a firm receives. As mentioned before, this data confirms the fact that later stage investments account for the most of the capital invested, proving an increasing interest for these types of investments.

[24] Image taken from (MCKINSEY & COMPANY, Grow fast or die slow: Why Unicorns are staying private, 2016)

Another important consideration is the fact that it seems that public markets assign higher multiples at the moment of IPO and afterwards, with also better performance, for companies that are larger compared to those that are smaller.

Figure 21: Evolution of Private Equity financing rounds from 2005 to 2015



25

There are no doubts that at a certain point, these investors will require an exit and cash in on their investments, but for what it seems now, it is still not the time. What will happen at a certain point is that these Unicorns will need either to go public or to be acquired by a listed company, and crucial will be their valuation at that point in time. Two different scenarios could emerge if still exists a mismatch between valuations in

[25] Image taken from (MCKINSEY & COMPANY, Grow fast or die slow: Why Unicorns are staying private, 2016)

public and private markets: the first scenario, and the most realist one, is that these Unicorns will start gradually to go through down rounds of funding with lower valuation levels up to the IPO date. Instead, the second scenario is that the valuation in the private markets will continue on the exact same path they are now on and at the moment of the IPO, these companies will see a drastic drop in their stock price due to excessive valuation to which they have been offered to the public. It is clear that the second scenario is the most wealth destroying one as losses could be severe. However, the first scenario is the most probable one as already some Venture Capital late stage investors like Fidelity and T. Rowe Price have marked down investments in some Unicorns from 10% to 50 %. It is becoming also extremely common to see high tech start-ups IPOs that rise less capital than their last stage pre-IPO funding round. These also means that the market in unwilling to assign excessive valuations to businesses that could potentially generate abnormal returns in the future, but that the most of them still didn't turn profitable. So far, in the last three years, 61 companies have gone public with a valuation of $ 1B or above, and the median that they are currently trading is around 3% their listing price. For some Unicorns their trading is also lower, like for Twitter or Alibaba. What is interesting also to notice is that between 1997 and 2000, there have been as many as 898 IPOs of technological US companies, with an overall valuation of $ 171B. However by 2015, also due to the burst of the Dot-Com bubble, only 303 survived. By 2010 of this 303 companies only 128 remained. These companies between 2000 and 2010 they have received an average share price return of -3.7%/year. Between 2010 and 2015 returned -0,8%/year (MCKINSEY & COMPANY, The 'tech bubble' puzzle, 2016). Hence, there are little doubts over the fact that valuations of Unicorns have been inflated due to exuberance of private equity

investors. Due to abundancy of funding and market euphoria, there are vibrant signals that there could be a bubble. Yet, it is still early to say what private equity funds will do, either continue to pour money in these companies or start devaluating them. What will be interesting to investigate in the next section of the paper is how Unicorns grow, the rationale behind Venture Capital's funding and the way these companies are being valued (MCKINSEY & COMPANY, Grow fast or die slow: Why unicorns are staying private, 2016).

Article VI. HOW UNICORNS GROW AND HOW THEY CREATE VALUE

In this section of the paper, will be taken three Unicorns as a sample to first infer their funding stages in order to get a better understanding of the increase in funding rounds. Secondly, these companies will serve as understanding of how Unicorns grow and how they create value. The Unicorns chosen are Uber, Snapchat and Xiaomi. The reason behind choosing these 3 companies are several:

1. Geographical: Uber and Snapchat are both US companies while Xiaomi is a Chinese company that is however traded in the US stock markets. By these means, USA and China are the largest producers of Unicorns by both number and valuation size.
2. Economical: Uber is the most valued high tech start-up at the moment, with over $ 60B valuation. It is considered as the probable next Supercorn, but is

still in the Decacorn phase. Snapchat is an app company that is valued around $ 16B, the 6th most valued Unicorn, and is the most valued app Unicorn at this moment. Xiaomi is the second most valued company among Unicorn, with a valuation of $ 45B, and is the most valued hardware company.

3. Business scope: Uber is the largest taxi company in the world, though not owning a single taxi. Still, its core business is service offering. Thus, it is a good proxy for Unicorns that are service providers. Snapchat is an app company that can represent other app Unicorns very well mainly due to the huge media attention that is currently receiving.

   Xiaomi is a hardware and software company that uses an alternative business model to offer its product and its proprietary software ecosystem, which is based on Android.

4. Growth model: Uber has grown mainly through organic growth, even though in the last year has begun acquiring other small businesses. Snapchat is a Unicorn that is mainly focused on organic growth while Xiaomi has adopted an organic growth model, but is now pursuing also inorganic growth objectives through partnerships with other smaller companies in foreign markets.

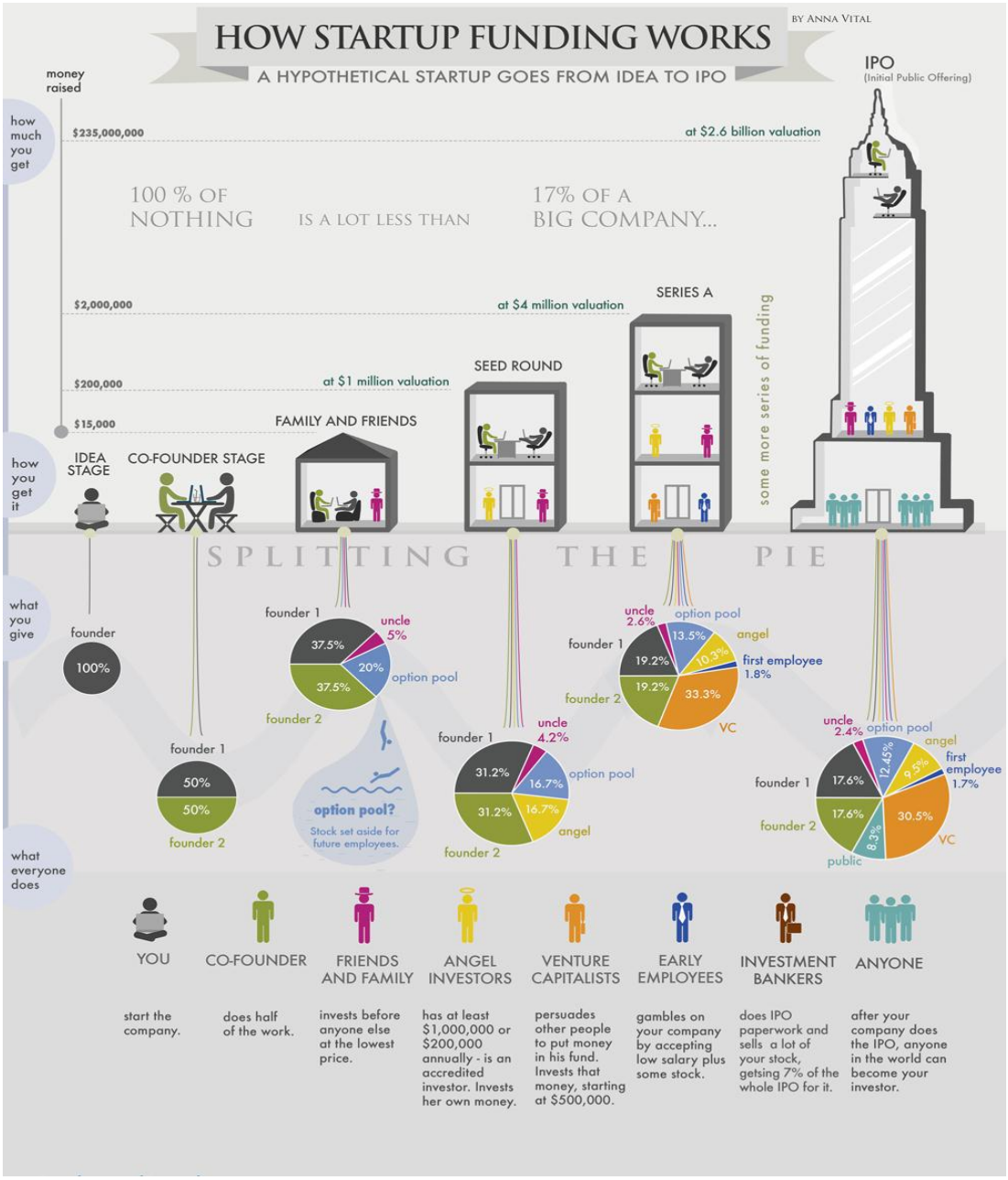
What Uber, Snapchat and Xiaomi have in common is that currently they are three big winners. Uber, even though has recently left the Chinese market and sold all of its assets and capabilities in the country to Didi Kuaidi, it can still be considered a winner since it has now an equity stake in Didi (and Didi obtained one in Uber too) and is now able to pursue other business growth opportunities. Snapchat in the last year has become “The mobile app”, with people going crazy for its social features. Lastly,

Xiaomi has proved over the last 3 years from scratch to have solid ideas on how it wants to be seen by people and on the philosophy of its business: an ecosystem designed by users with quality hardware at an affordable price.

Section 6.01 FUNCTIONING OF VENTURE CAPITAL FUNDING

Venture Capital funds are the most used source of cash for start-ups while they are private. Until the IPO date or when they are sold to a listed company, VC capital is the only way for a young company to pay its expenses, fuel its investments and continue to grow. Actually, Venture Capital when is raised goes in the equity side of the balance sheet of the company. The idea behind it is the "split of a pie" concept. Equity, or also shareholder's capital, is the amount of money that people have invested in the company. The company ownership can be seen as a pie, and the size of the pie is given by the amount of equity capital in the company. This equity pie is then split up in slices, with each slice representing an investor of the company, and its slice will be as big as the amount of capital invested in the company in relation to the overall equity capital.

Figure 22: How VC funding works



26

When start-ups are first created, owners have 100% of a pie that is worth almost nothing or has a really low value given the capital they, or friends or relatives, have

[26] Image taken from (Vital, 2013)

invested in the company to simply start it off. As time passes and the company starts to receive outside investments the equity pie grows and it becomes sliced among different people investing in it. For the owners a reduction in their slice of the pie is still welfare enhancing as a smaller slice of a big equity is more than a bigger slice of a really small equity. As the company grows it starts to attract new types of investors. The first big investments that a young start-up receives are from "Angel investors". Angel investors are wealthy people that like the business idea and decide to invest capital in the company. These initial investments are also called "seed investments". Seed capital that is raised by a company is between $ 500K and $ 2M, although cases might differ. This type of capital is the first one that is used by the company to nurture the idea and hopefully access future rounds of investments.

As the company has proved to have a solid business idea and organization, but with the need of new capital to continue to grow, investors' appetite for it grows. At this moment a start-up can access to "Series A" VC funding. This type of capital is mainly used to optimize the business, product and access vital markets and user base. The main investors that contribute at this moment are big Venture Capital firms like Sequoia. The amount of capital raised at this stage goes from $ 2M to over $ 15M.

The second round of VC investments that a start-up goes through is "Series B" funding. This capital is mainly used for the development of the company, to expand the market reach and to bring to the company to a more solid business model. The capital provided in series B funding goes from $ 7M to $ 10M.

As the company has proved to be successful, has scaled up and is generating revenues even though it might still need to turn profitable, it can access third round of VC

investments, “Series C” funding. Series C investors are investment banks, institutional investors, private equity firms or big public investment groups.

The main objective of this stage is perfecting every aspect of the company, strengthen the scale up process and business reach and prepare the company for the IPO of an M&A process.

Currently, as it has been observed in other sections of this paper, funding rounds are not anymore limited to A, B and C but can go over E+. The rounds subsequent to round C have the same scope but investors are mainly interested in earning at least double of the stake they have invested in the company. Obviously, the more rounds a company goes through, the more the equity pie grows. The valuation of the company is linked with the amount of capital that is invested in the company, thus the more and the larger the series investments, the more the company will be valued. Below is possible to observe the funding rounds of Uber, Snapchat and Xiaomi respectively. As is possible to observe all three have surpassed 3 rounds of VC funding and perhaps will go into others over the next months as their IPO filing has not been filed yet. Snapchat among the three is the one that has reached Unicorn status the quickest, in just 1 year, while the other two took more than 2 years. These cases confirm that the amount of funding rounds has increased and the amount of time a company is staying private has widen (Vital, 2013).

Figure 23: Uber funding rounds

Date	Amount / Round	Valuation	Lead Investor	Investors
Jul, 2016	$1.15B / Debt Financing	—	Morgan Stanley	4
Jun, 2016	$3.5B / Series G	—	Saudi Arabia's Public Investment Fund	1
Feb, 2016	$200M / Venture	—	LetterOne	1
Aug, 2015	$100M / Venture	—	Tata Capital	1
Jul, 2015	$1B / Series F	—	—	4
Feb, 2015	$1B / Series E	—	—	7
Jan, 2015	$1.6B / Debt Financing	—	Goldman Sachs	1
Dec, 2014	$1.2B / Series E	$40B	—	6
Jun, 2014	$1.4B / Series D	$18.2B	Fidelity Investments	8
Aug, 2013	$258M / Series C	$3.5B	GV	3
Dec, 2011	$37M / Series B	—	Menlo Ventures	11
Feb, 2011	$11M / Series A	$60M	Benchmark	6
Oct, 2010	$1.25M / Angel	—	First Round	30
Aug, 2009	$200k / Seed	—	Garrett Camp Travis Kalanick	2

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[27] Image taken from (CRUNCH BASE, 2016)

Figure 24: Snapchat funding rounds

Date	Amount / Round	Valuation	Lead Investor	Investors
May, 2016	$1.8B / Series F	—	—	11
Apr, 2016	undisclosed amount / Series F	—	—	0
Mar, 2015	$200M / Series E	—	Alibaba	2
Dec, 2014	$485M / Series D	$10B	Kleiner Perkins Caufield & Byers	4
Dec, 2013	$50M / Series C	—	Coatue Management	1
Jun, 2013	$20M / Secondary Market	—	—	0
Jun, 2013	$80M / Series B	$800M	IVP (Institutional Venture Partners)	6
Feb, 2013	$12.5M / Series A	—	Benchmark	3
May, 2012	$485k / Seed	—	Lightspeed Venture Partners	1

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Figure 25: Xiaomi funding rounds

Date	Amount / Round	Valuation	Lead Investor	Investors
Apr, 2015	undisclosed amount / Undisclosed	—	Ratan Tata	1
Dec, 2014	$1.1B / Series E	$45B	—	6
Aug, 2013	undisclosed amount / Series D	$10B	—	0
Jun, 2012	$216M / Series C	$4B	Morningside Group	2
Dec, 2011	$90M / Series B	—	Morningside Group Qiming Venture Partners	6
Dec, 2010	$41M / Series A	—	Morningside Group	2

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[28] Image taken from (CRUNCH BASE, CRUNCH BASE, 2016)

[29] Image taken from (CRUNCH BASE, CRUNCH BASE, 2016)

All being said, the final scope of VC rounds is to have a solid company that can go through an IPO process and access public markets and a new and larger pool of capital or be acquired by other, larger companies. Either of the two options, these two events represent the exit strategy of VC Series investors in which they hope to cash in on the capital invested.

Section 6.02 HOW START-UPS GROW: ORGANIC VS INORGANIC GROWTH

By looking at the growth models that Unicorn have adopted, it is possible to divide companies between those who pursue organic vs. inorganic growth. The choice between the two models is given by industry and market specific factors, the type of product offered, the age of the company, the type of business model used and the amount of funding received. There is no "better" approach, but each approach must be weighted on the situation that each company is facing. Below is possible to observe among a sample of high tech Unicorns and high tech public markets, the growth model pursued and the profits these companies are now generating (+ is for positive earnings, - for losses on earnings).

Figure 26: List of high tech companies based on organic and inorganic growth

Company	Organic Growth model (OG)	Mergers and Acquisition model (M&A)	Profit (+/-)
US			
Apple (1976)	OG		++
Google (1978)		MA	++
Amazon (1994)	OG		-/+
Akamai (1998)	OG		+
Facebook (2004)		MA	+
Twitter (2006)	OG		--
Zynga (2007)	OG		-
Airbnb (2008)	OG		-
Cloudera (2008)	OG		-
Uber (2009)	OG		--
Asia			
Tencent (1998)	OG		++
Alibaba (1999)	OG		++
Baidu (2000)	OG		++
Kakao Talk (2006)	OG		+
Flipkart (2007)		MA	--
Garena (2009)	OG		n.a.
Xiaomi (2010)	OG		+
EU			
Shazam (1999)	OG		-
King.com (2003)	OG		+
Criteo (2005)	OG		+
Spotify (2006)	OG		-
Rocket Internet (2007)		MA	--
RoW			
Naspers (1915)		MA	++

30

Organic growth is achieved by increasing output and volumes sold (sales). Most young start-ups use this growth model, with the company that expands as the markets grows. Usually, organic growth can be divided in a two-step process: firstly, the company targets its domestic market and is able to grow in an environment that is familiar. Competition in domestic market might be intense but limited to the single market and domestic companies can exploit local advantages over foreign ones. As the start-up

[30] Image taken from (Simon, 2016)

grows, it aims at becoming the lead company in its domestic market. Subsequently to becoming the market leader domestically, these companies start to target foreign markets with their innovative products. Often, these companies are able to successfully enter other markets and gain a significant portion of customers from competition by leveraging on their domestic market. An example can be taken from Chinese companies: by leveraging on their huge domestic market, have been able to gain a significant portion of the mobile and Internet global market. Xiaomi is a great example of a two-step strategy, in which it has begun offering its products only in China and is now expanding in adjacent geographic markets. However, the means of geographical expansions are not 100% organic since Xiaomi is now acquiring or entering in partnerships with local companies in foreign markets that it is targeting, thus pursuing also a inorganic growth.

Another example of a two-step strategy but with the difference that each new country targeted has an independent strategy can be seen with Spotify. Spotify is pursuing now a market-by-market strategy due to the nature of the industry in which it operates. Even though it has leveraged on its domestic country initially, it has not pursued a global uniform strategy but a country specific global strategy. However, there are other cases in which young companies start targeting directly several geographical markets, like Uber did with its taxi services, pursuing a one step process. Snapchat, by the nature of the industry in which it operates, is also pursuing this strategy. The table below shows among a sample of high tech companies which type of organic growth approach they have chosen and the relative size of the market that they are targeting.

Figure 27: List of high tech companies based on one/two steps organic growth

Companies	1 step	2 steps	Size of market[41]
US			
Airbnb		x	25 million guests, in 34 000 cities, 190 countries
Akamai		x	Serves top 30 media and entertainment companies. 170 000 servers in more than 1 300 networks and over 100 countries.
Amazon		x	10 online marketplaces, 2 in North America, 5 in Europe, 3 in Asia.
Apple		x	460 retail stores in 17 countries and an online store available in 39 countries.
Cloudera	x		20 countries, 1 400 partners
Facebook		x	1.248 billion active users
Google		x	More than 100 languages and in more than 50 countries
Twitter		x	288 million active users
Uber	x		56 countries, 200 cities
Zynga	x		100 million monthly users
ASIA			
Alibaba		x	255 million active buyers worldwide
Baidu		x	642 million users
Flipkart		x	26 million registered users
Garena		x	17 million monthly active users on PC, 11 on mobile
Kakao		x	140 million users
Tencent		x	QQ 848 million active users WeChat 549 million active users N°1 worldwide for video games
Xiaomi		x	61.12 million phones sold in 2015
EU			
Criteo (FR)	x		37 countries, 4000 e-commerce companies
King (UK)	x		356 million average monthly unique users
Rocket Internet (D)	x		110 countries (Not US, China)
Shazam (UK)	x		100 million active users
Spotify (SW)	x		58 markets, 60 million active users
RoW			
Naspers		x	More than 130 countries

31

On the other hand, inorganic growth is a growth model obtained by a company with acquisitions, takeovers or mergers. It is mostly pursued by companies that are more mature or that have a wider availability of capital due to higher costs implied: Facebook, Google, Rocket Internet and Flipkart. Instead of developing internally assets, these companies acquire other smaller companies and are able to access these

[31] Image taken from (Simon, 2016)

assets without undergoing development expenses. Currently, both Uber and Xiaomi are beginning to mix their organic growth model with acquisitions of smaller players in the other geographical market or other adjacent sectors. The main reason for this growth model being used by not so many companies is in the fact that M&A/takeover deals are very complex processes. The bidder must be able to internalize the target company and lay the foundations for synergies to arise. If the process is not done properly future performance can be seriously negatively altered (Simon, 2016).

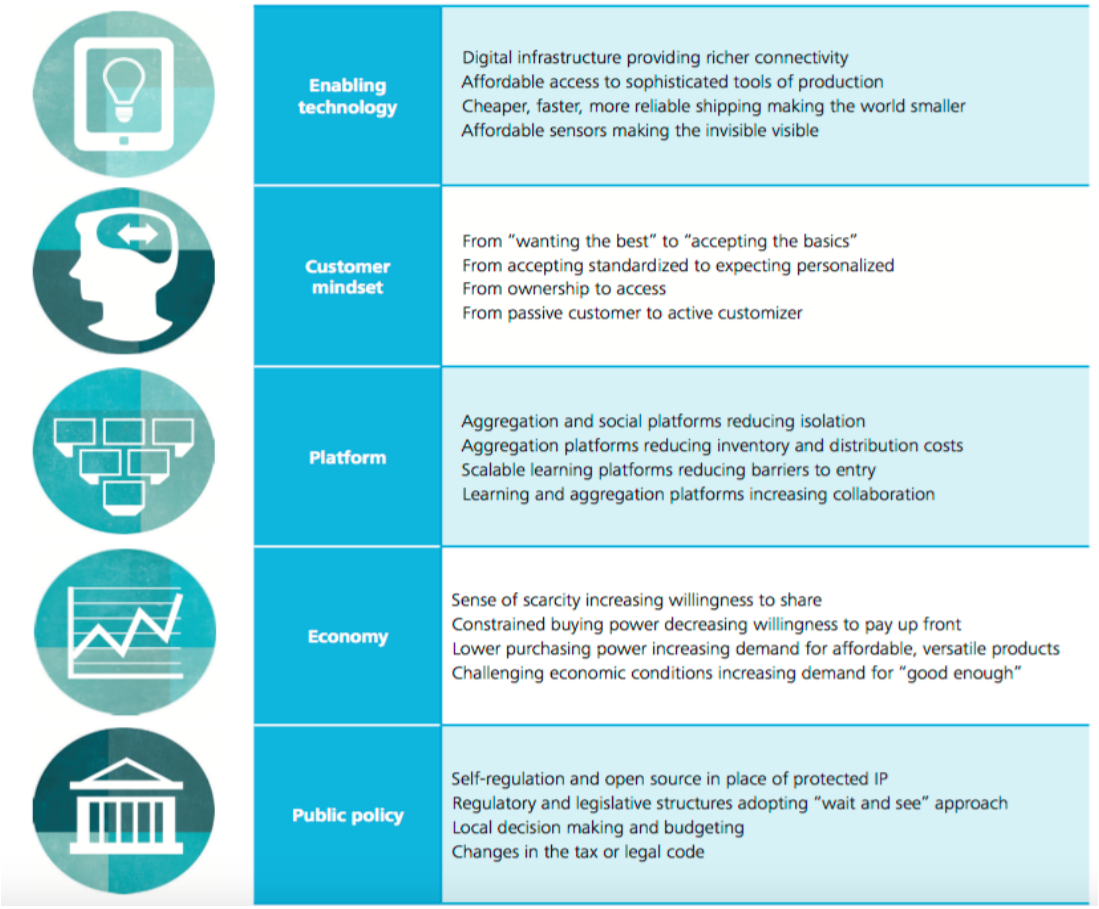
Section 6.03 UNICORNS' VALUE PREPOSITION AND THE PROCESS OF VALUE CREATION

It is important to understand the true potential of Unicorns in creating value for the society. Back in the Dot-Com bubble in the 2000s, high tech companies were being valued so high because of a prosperous future that every investor was imagining. In people's mind there was the vision of a world that was changing and the Internet space was at the core. The returns of these companies were not relevant back then, but it was much more important the forecasted value that these companies would bring in the future world. Now the story is different because the world is being totally taken over by Internet and web companies. Everything, as seen with the current technological wave, is being digitized and the connection between the material world and the digital one is strengthening. As already mentioned in this paper, Unicorns are companies that are changing the way services and products are being offered to end customers. In other words, these Unicorns are revolutionizing the way people do things, like Uber

with taxis or Spotify with music. At the core of these industry revolutions there are several catalysts that enable the shift from traditional markets to the digital ones. Catalysts are changes that occur in the wider environment, shifts from traditional historic conditions to new ones and are not under companies' control.

From these catalysts, companies are able to spot unfulfilled needs and leverage on them. From the graph below, is possible to spot several catalysts that have begun the shift from traditional markets to the digital environment: Technological progress, change in customer's mind-set, emergence of aggregation needs, changes in economic conditions and public policy (John Hagel).

Figure 28: Catalysts that enable industry revolutions



[32]

The combining effects of these catalysts have led to the emergence of Unicorns and disruption of traditional industries. Using technology to disrupt entire industries and change how people do things is the way Unicorns truly create value. What can be observed in the XXI century is the emergence of the "Sharing Economy". People are now starting to share services, products up to their life events. These Unicorns are not only changing the industry in which they are in, but are true global economic innovators. With huge digital capabilities these companies are changing both the

[32] Image taken from (John Hagel)

supply and demand side. In essence, the most of the Unicorns are platforms that ease the match of supply and demand. From natural industries that were created around people's needs, these companies have understood the change in society's needs that arises from traditional activities and are matching those needs in a more efficient way than conventional players. Evidence is the creation of several markets inside each industry, which before didn't exist, due to digital efficiency and an exponential market scale performance:

- In the media and advertising industry Facebook has realized that people were wanting more than what the natural industry players were offering at the beginning of the current century. By offering a place where people could interact, share their life events, news Facebook has been able to satisfy an implicit need that was not spot by any other industry player. Thanks to digital efficiency Facebook has been able to offer to people an efficient and easy way to satisfy their needs. In parallel, it has created a new market within the Media and advertising industry that was not spotted before.

- For Tourism industry, Airbnb has been able to spot the need of people for a simpler way of accommodation in cities different from what hotels were offering. The need of having a house in vacation without the need of owning, building or renting an apartment or looking for hotels has been the main driver for the emergence of Airbnb. Currently, Airbnb is the largest provider of accommodation in the world without even owning a single apartment.

- In the Travel and transport industry, Uber has been able to spot the need for an easier and transparent way of travelling in cities. Without owning a taxi or a limo it has become the largest taxi provider in the world.
- In the Human Resources industry, LinkedIn has been able to change how people interact with companies they want to work for. The way head-hunters and personnel agencies worked did not satisfy the need for workers to connect more closely to the companies they wanted to work for. Currently, LinkedIn is the biggest professional provider in the world.

The common feature that these disruptive companies have among them is easiness. They have brought supply and demand closer than ever and made easier the interaction between the parts and made the entire process more efficient. Technological progress has been able to exponentially shift the welfare of the society and Unicorns are the industry players that have been able to capture the underlying potential thanks to their flexible and young business models (Orizi, 2015).

Article VII. VALUING UNICORNS: HOW TO CAPTURE THEIR TRUE POTENTIAL

In this section will be analysed how a high tech Unicorn can be valued by avoiding simplifications and misleading valuations. It was one of the objectives of this paper also to assess the valuation of Uber, Snapchat and/or Xiaomi and compare them to current valuations. However, after extensive research with Eikon Thomson Reuters, Bloomberg Professional, LexisNexis Academic and Company Dossier, Factiva, Osiris and Orbis, it has not been possible to find financial data for these companies. The main reason is that these companies as being incorporated in the US are not obliged to disclose financial information to the public. The scarce financial data that could be retrieved online is both incomplete and not suitable for financial modelling analysis. What instead will be analysed in this section is a theoretical approach for valuing Unicorns and, where possible, take as proxies Uber, Snapchat and/or Xiaomi.

Section 7.01 A THEORETICAL APPROACH TO UNICORNS' VALUATION

Valuations have always been at the foundation of financial markets' mechanisms. Throughout the different financial crisis that have followed over the years, valuation issues have always played a central role in the rise and collapse of many stocks. The amount of cash that investors piled into certain stocks over others has significantly raised the solidity of how valuations are done. Going back to the current situation,

where investors are giving to high tech start-ups big piles of money, also the SEC in 2015 has started investigating how mutual funds assigns so varying valuations to high tech companies. For sure, it is not possible to use any type of valuation method for Unicorns for several reasons: negative returns, good benchmarks missing and scarce solidity of some models that cannot fully assess the true value of a start-up. A method that is able to be tailored on the target company and that gives a reliable valuation estimate is the Discounted Cash Flow Model (DCF).

The DCF model is able to capture the unique value of high tech start-ups by taking into account different inputs like market and industry developments, growth of the company, penetration rate and company's operational characteristics. The key assumption to have the DCF model work for start-ups is to not to focus on past performances of the company, but rather at the long term development of the market in which the company operates in and then look backward to derive the current valuation. In this way is possible to capture also the intrinsic potential of the start-up that historical data cannot show. The first step is to understand the evolution of the company from a hyper-growth state into a stable long term growth and the time period. Usually, it can be taken as a ballpark number a time lapse of 10-15 years before a start-up moves into a stable long-term growth. Thus, firstly it has to be assessed the company satisfies customers' needs and then how the company generates money. The way a company generates money is crucial for the fact that even great business ideas don't always translate into a solid business model that is able to generate revenues. By taking into consideration both aspects, it is then possible to estimate the size of the potential market. For example, Uber satisfies customer needs by offering an ultra-rapid

taxi and limo service, thus matching the demand of mobility of people with the supply of taxis and limos that are waiting for a new customer. The way Uber makes money from a percentage of the revenues that drivers earn. Thus, the main market for Uber are taxi and limo services, which accounts for roughly $ 125B. However, Uber could also access adjacent markets like car rentals, mass transit and car sharing.

Figure 29: Annual revenue for other Uber adjacent markets

[33]

By adding up the current market for taxis and limos with the market size of the adjacent markets the total target market that is open to Uber is around $ 310B. It is difficult to estimate how much Uber will be able to capture of the total target market but, it is possible to assume that as the number of runs that drivers make with Uber increase, thus users of Uber services, also prices could decline by still maintaining a high operating margin. Thus, the number of users in each market could increase due to lower costs.

The next step is to forecast the number of users that will access the product and the estimated revenues per client in the future. To evaluate the growth rate of these two inputs is possible to use historical data and competitors' growth rates. By multiplying these two inputs is possible to obtain the revenue that will be generated 10-15 years

[33] Image taken from (Molla, 2016)

from now. Subsequently, the forecasted revenue must be verified by forecasting the potential market in the future. The growth rate that will be used to estimate the future market size must also reflect the high level of uncertainty, thus is advisable to be conservative when choosing the rate. The last step at this point is to compare the revenues that the company will make in 10-15 years with the forecasted market size at the same time and extrapolate the relative market share. The following steps are to find the long-term operating margins, the capital investment needed to grow the business and the return on invested capital (ROIC). These inputs are needed to find the relative cash flows for future years. To assess the operating margins is useful both to look at historical data of the company and the ones of competitors and of similar companies that have a similar business model. Furthermore, it can be assumed that for Internet companies the capital investment in fix equipment will be low. It is useful to assess the percentage of capital invested by other peer companies as a proxy for the company that is being valued. Regarding the ROIC, it must be taken carefully as for Internet companies ROIC can be extremely high and lead to misleading results. It is not uncommon to find Internet companies that as soon as they turn profitable, their ROIC reaches high figures. Subsequently, it is needed to match the forecasts derived so far to the current performances of the company and the speed of transition from present to future (e.g., for how long fixed costs will be higher than variable costs or/and how long it will take for revenues to grow faster than capital raised). To assess the transition and the speed it is needed to analyze the progression of similar companies on historical trends. The problem that could emerge is that for high tech companies, long term investments lies mainly in intangible assets, and these investments must be expensed under current accounting rules; leading to understated accounting profits.

As is possible to observe, the majority of input's forecasts done are made with best-guess estimates, peers' analysis and market trends as well as a company performance. Hence, there is a clear problem of uncertainty that could lead to misleading valuations (Damodaran, 2009).

To lower uncertainty, it is useful to use weighted-scenarios methods to take into account alternative evolutions of the business environment. When using weighted-scenarios, it is useful to assess financial data both in an optimistic and pessimistic way. Moreover, each scenario will need to be weighted by a probability of occurrence. These probabilities are subjective on difficult to be backed up by real word data. Yet, it is crucial to give to each scenario reasonable probabilities to avoid distorted scenarios. A reduction in the probability of one of the scenarios leads to a big reduction in the final valuation of the company. Thus, these probabilities should be adjusted to historical performance of other similar companies. It is clear that for young high tech companies' uncertainty is extremely high with respect to mature companies. This is also why young companies' valuations tend to be highly volatile. The main reason lies in the fact that it is impossible to predict which start-ups will be winners and which will be losers. An example can be taken from the current situation of Snapchat and Instagram. As it has been shown so far, Snapchat is the market leader in its market segment, but since few months it has seen its market share erode from the introduction of Instagram Live. By using its competitive advantages and bigger user base, Instagram Live can seriously take over Snapchat's. As of now, Snapchat is valued at $ 15B - 18B and if users decide to switch to Instagram for this kind of services its valuation could realistically drop. Truth is, the business solidity of Snapchat will be

strongly tested. Thus, in the environment in which Unicorns are in, thus a winner takes all markets, it becomes extremely difficult to decide in which one to invest. The least that can be made by investors is to understand this uncertainty in the best possible way in order to make conscious decisions (MCKINSEY & COMPANY, Valuing high-tech companies, 2016).

Article VIII. FINAL CONSIDERATIONS AND CONCLUSIONS

From what has been acknowledged in this paper, Unicorns are rather young IT companies that are able to match unfulfilled demand with innovative supply of affordable products and services. The majority of services and products offered relies on mobile technology and on the opportunities that are introduced by technological progress. At the core, these companies are centred around concepts of network effects, economies of scale and scope, two sided platforms and operate in "winner-takes-it-all" markets. Furthermore, Unicorns are highly dependent on VC capital and on a favourable business environment that is giving remarkable valuations. Considered by many the "Unicorn phenomena" to have a limited range, it is surprising how many billion-valuation high-tech private companies are being created every year. This phenomenon is primarily market-led, with its core in the private equity market. As it has been observed in this paper, Unicorns represent a phenomena of excessive valuations given by the evidence provided when these companies go public. Due to an enormous amount of committed but uninvested capital in the technology sector, investors are strongly betting on any innovative high tech company. It has been shown

that the time span before a private tech company goes public has increased, as well as the type of investors at the last stage of VC funding round. Starting from "Series C" funding rounds, institutional investors are entering with big money in the equity pies of these high tech companies. Additionally, the funding rounds have widened, reaching "Series G" funding rounds or further. Likewise, Unicorns that have decided to go public in the previous years have found little fertile ground to grow over their pre-IPO valuation. Even though it seems that financial markets assign higher stock prices to companies that stay private longer, it is also true that the more these companies stay private the more they grow. Consequently, when their stocks start to float in public markets their valuation is adjusted to lower levels, given the fact that currently stock markets seem to be far away from the speculative years of the Dot-Com bubble. Actually, the Global Technology Market is performing side-to-side with the Global Market and there is little ground to think of public markets malfunctioning. Therefore, with little or no upside that is left to Unicorns' investors at the moment of IPO, it is reasonable to assume severe losses when these companies go public or are acquired by other quoted companies. Since both private and public investors could be affected by these inflated assets' valuation, also the SEC in 2015 has begun to investigate how these companies are valued. By looking at the rationales behind Unicorns and their astronomic valuations, it is possible to find the concept of "creative disruption". Their innovative force is believed by investors to bring an exponential growth to society's welfare and consequently also high returns for them. Nevertheless, these Unicorns are also disrupting traditional industries and markets. The value added that these companies bring must be accurately understood as valuations should be based on the true value that companies create. As observed throughout this document,

there are plenty of valuation methods that come to hand in different situations. Still, only the Discounted Cash Flow model, by using the Free Cash Flows of the company, is the only method that gives a truthful valuation in the case of Unicorns. By forecasting the future and working back to the present, it is possible to incorporate in the final valuation total market development, the company's market penetration, business growth, competitive pressure and business' financials. Even though the DCF model is highly biased by the quality of the assumptions used, it is the only one that is able to incorporate both the quantity and diversity of inputs. Besides, this model needs to be updated over time for each company as inputs can vary with time. As discussed previously in the paper, Unicorns operate in markets were the leader captures almost the entire market share. Thus, market conditions can quickly change, like is happening now with Snapchat and Instagram. Moreover, also with the DCF model uncertainty still remains significant. Nevertheless, it is in the nature of start-ups to have high risk. The only way for investors to take sound decisions is to understand at their best this uncertainty and weight the upsides and downsides.

Therefore, the final balance is still unknown and is not possible to say if Unicorns' positive spill-overs will overtake negative ones. Moreover, it is also hard to predict if private equity investors will start down rounds for Unicorns that are considered overvalued, or if high valuations will continue. As already seen in this paper, with the latter option there is a substantial risk to incur in big losses. From the Institutions' side, in USA Unicorns have been given the possibility to stay private longer with the JOBS Act in 2012. With no surprise, the majority of Unicorns are from USA and China[34]. However, in Europe and in each of its national governments, there is still little talk

[34] Chinese Unicorns are incorporated in the USA

about the “Unicorn phenomena” and its effects on society. Governments have showed up to this point different reactions: helping incumbents, supporting established leaders or taking a wait-and-see strategy. For sure, even if outside the aim of this paper, it will be needed to understand the effects of Unicorns on employment, economic growth, society’s welfare as well as financial stability. It will be interesting to see if corrective actions will be taken by policymakers or directly by market players before euphoria, like in the Dot-Com bubble, spreads also to public markets and losses start to pile up. Similarities with the 2000 tech bubble are various, from the abundancy of capital to private market euphoria for future years. For investors will be crucial to assess which companies are true winners and which are not, directing their money to Unicorns that have a real competitive advantage, leaving the losers to vanish in time.

Article IX. REFERENCES

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Article X. TABLE OF FIGURES

Article XI. EXECUTIVE SUMMARY

From 2009 onwards, it has started a new wave of highly valued private technological companies, also known as “Unicorns”. In this paper will be discussed and analysed the possibility that these Unicorns have been given a too high valuation as a symptom of a possible malfunctioning of the private equity market, resulting in a bubble. Looking at the current economic environment, an economic cycle is ending and a new one is beginning. The cycle that the world is leaving behind is one that has begun in the 80s and that has been characterized by returns to investors that have been higher than long term averages. In terms of stock returns, investors in western countries have experienced on average 7,9% return, compared with the 100-year average of 6,5% return in the USA and 4,9% in Europe. Regarding bonds, in the US in this 30-year period investors have seen a return of 5,0% while in Europe it has been of 5,9%. Compared to the 100-year average of bond returns of 1,7% in US and 1,6% in Europe, this period has been very prolific for investors. Expectations for the new cycle are undeniably lower, with equity returns of 4%-6,5% for the USA and 4,5%-6,0% for Europe, with forecasts for fixed income investors of returns even lower, between 0% and 2% for both the USA and Europe. Thus, the situation that might be ahead is a low-return environment, with future market returns that will likely be lower than now. By taking a look at the Private equity market, 2015 has been a year that has proved healthiness of the PE market, but it has not reached the levels of 2014. Actually, due to an economy that is showing mixed signs together with intense competition and economic conditions in markets that have been analysed above (e.g., low interest rates, increased volatility) there are many challenges ahead. In 2015, from private company

exits have begun a strong wave of mergers and acquisition. Yet, the global buyout-backed exits' levels of 2015 are lower than 2014, but also this year PE market has outpaced the performances of public markets. However, by looking at the levels of fund raising, it is possible to see that from the peak of 2013 of roughly $ 200B the levels have been declining throughout 2014 and in 2015 too. On the other hand, the buyout deal value in 2015 has increased even more, reaching more than $ 250B, on a 5-year time-span, has been the highest. Looking at the last decade, global economy has been severely hit by the burst of the Dot-Com bubble, with public high tech companies' valuations reaching levels far from their fundamental values, and by the Housing bubble and subprime mortgages financial crisis. By focusing on the Dot-Com bubble, its effects have been enormous, leading to not only changes in performance but also the strategies of investment have muted. It took several years for the private equity to recover and return to pre-crisis levels. Moreover, the effect of the bubble was similar both in Europe and US. Between the end of 2001 and 2002, the private equity industry, in particular the Venture Capital sector, experienced what was at that time the biggest ever decline. The biggest losses occurred in the Telecommunication sector (-38,3%) and in Internet-related companies (-27,7%). With no surprise, these industries had extraordinary 3-year returns of 69,7% and 35,7%. Without any doubt, the Internet-Telecom boom and burst had visible effect on the Venture Capital sector. Looking at numbers, for the National Venture Capital Association (NVCA), investments in the last quarter of 2001 were at $ 7.1B, which was about a third of the prior year, when it was $ 20.9B. Likewise, the amount of capital raised in the last quarter of 2001 was around $ 4,6B, and it was 80% lower than the previous year, when it was $ 23.4B. However, by comparing the numbers of 2001 with the ones of 1999, it

is possible to observe that in the last quarter of 2001 capital investments were slightly more than in the first quarter of 1999. In 2001 the annual amount invested was $36.5M, which was more than five folds larger than the one of 1995, when the annual amount was $5.9B. Moreover, 21% of the 196 firms, which were active fund-raisers between 1992-2001, did not raise any other fund after 2002. It is interesting to notice that during the Internet boom, companies begun to go public earlier than ever before.

Before Netscape, it was unthinkable for a company to go public with only one product making 100% of profits. After Netscape, relying only on a single product became extremely common. Companies were now able to go public without even making profits. These companies were mainly start-ups and for the very first time stock markets were exposed to the risk of early stage companies. What was observed during the years of the bubble, was that good companies grew even bigger while losers were hard to spot and before exiting the market they were given the possibility to burn tons of money. However, the failure rate of quoted Internet companies in the years of the bubble for sure has been among the highest between all the industries.

It can be argued that what happened during the bubble is an overreaction both to the higher returns experienced at the beginning of the bubble in 1998-1999 and to the lower returns that were generated during 2001 and 2002. Usually, winners and losers are spotted at similar rates since at any point in time there are new winners and new losers. However, due to the euphoria that the Internet had brought in the market, early winners, such as Amazon and Ebay, were regarded as the new industry standards. Any investment was meant to replicate their success. Despite the initial growth prospects, the losers at a certain point showed up in numbers. Due to the vast quantity of companies that was not able to turn their negative cash flows in profits, the market

overreacted by implying that the new state of art was an environment with low returns. Very few people considered that the return volatility was a temporary deviation from the normal rate of returns obtained before the beginning of the bubble. Actually, few people realized that they were in a bubble.

Lately, it has been put a lot of emphasis again on technological companies with high valuations, also called Unicorns. The term "Unicorn" has been drafted for the first time by the Venture Capitalist Aileen Lee, founder of Cowboy VC, and early stage Venture Capitalist. With this term she initially meant that finding a company that being a start-up was valued so heavily was as rare as finding a Unicorn.

Unicorns are IT-centric companies with a focus on software offering, but also hardware in some cases (e.g., Xiaomi). These companies are usually young companies that operate globally, or in more than one country, by offering innovative services to customers whose demand has not been met by the current market players. These new demands arise from the current Internet mobile wave and these companies, in order to satisfy these needs, rely on connectivity infrastructures, new devices and the combined opportunities that arise from the two. These companies are based on economies of scale and scope as well as, and to a large part, network effects. For these companies to operate, they must rely on a favourable business environment and on fast growing market niches and customer segments.

As they serve untargeted customers and market niches, they are also disruptive for other industries that until now have distributed their products in other conventional ways. Moreover, these Unicorns are Venture Capital-dependent and there is a tremendous competition for investing in these companies. This extreme competition is bringing to extreme valuations, leading possibly to a new market bubble.

In the 2000 what has been observed by investor was a public financial bubble that when bursted affected the entire financial system. At the beginning of 1998, valuations of high-tech companies were 40 % higher than the general market valuations. It is not until 2000 that these valuations reached a peak of 165%. However, even at this point in time the highest valued high tech company barely reached a valuation of $ 6B when it was taken to the IPO. In today's numbers these are nothing special. As already observed above, there are over 100 companies that can be recognized as companies with a valuation above $ 1B and the most valued Decacorn has reached a valuation of almost $ 70B. However, by looking at the market conditions, it is possible to spot differences between today and 16 years ago. The market today in any way is not overvaluing high tech companies like it wrongly did during the Dot-Com bubble. In 2015, the aggregate valuation of floating high tech companies, in line with the rest of the market, was around 20 times their earnings and has been stable since 2010, with only 10 % higher than the valuations of the rest of the market participants. Currently, these market conditions are not ordinary as these valuations are among the lowest for what has been seen over the years. On historical trends, high tech companies' valuation has averaged a 25 % valuation premium over the other companies.

Besides, current valuations of high-tech public companies are in line with the general market globally. Excluding the 2000 Dot-Com bubble years, since 2011 the valuations between the two market have been closely floating. However, the pragmatism and the financial metrics that have been applied so far in public financial markets are very different from what is being done in the private equity market.

The discrepancy between the two markets is creating another precedent for what could be a loss in the long run of value for investors. What is being observed in the private

equity market are skyrocketing valuations, with high tech Unicorns that reach their spike in valuation before even going public, at the pre-IPO stage. The result is a decrease in stock price after the IPO process. It has been observed that after 2009 it took on average for a new high tech start-up 18 months to become a Unicorn and rise more than $ 1B of funds in the private markets. The precedent that is being created here is one that goes behind the conceptual framework of the private equity investment concepts: usually investment in private companies had the objective to increase their value and at the end of the time span, usually 5 years, in which private investors held these companies, up to an exit opportunity to cash on these companies. In other words, there had to be an upside that these investors could realize over their investments. By comparing the market capitalization of these high tech companies in 2015 that went public from 2011 with their pre IPO funding stages, which some date back also in 2003, it has been possible to observe how these stocks are performing. Companies that received pre IPO funding in 2008 and 2010 are now trading at multiples in a range of 10-12x. These companies, especially the ones in 2008, due to the financial crisis received less pre IPO funding (in 2008 the average was $ 273Magainst the $ 1B in 2013), thus begun floating at lower valuations. As the economy recovered, the investors were able to see an appreciation in their investment and a big upside. Among the 2008 companies it is possible to find Imperva, Veeva, Trulia, Tableau, and Palo Alto Networks. Instead, the main top performers of the 2010 companies are LinkedIn, Proofpoint, Fusion-io, Demandware, and EPAM Systems, which are now trading at high multiples. Instead, the companies of 2003-2007 have been averaging around 6.2x on their valuations. The worst performing year has been 2009, at the peak of the 2008 financial crisis, with 0,9x on average on their pre-IPO valuation.

By observing the 2011-2013 companies, pre-IPO investment in these companies gave to the investors after the IPO a valuation ranging between 2,6x and 3,3x. However, compared to the 2008-2010 values, there is a substantial difference, with the trading multiples in those years of 8.1x-12.0x. This means that at the moment of the last funding, the private equity market was already valuing more aggressively these companies, leaving a lower upside to investors. Evidence can be found even more clearly in the 2014 and 2015 companies. Companies among Etsy, OnDeck, LendingClub, New Relic, Box, and Hortonworks after their IPO traded at multiples of 1.1x on average. At this moment, it is possible to state that the private equity market has been already giving skyrocketing valuations, since an exit gain for private investors with IPO of 0,1x is extremely low.

By plotting the late stage performance of these stocks on the pre-IPO funding stages, it is possible to observe that almost 40% of the companies in 2015 were trading at valuations lower than their pre IPO one. Moreover, the median increase in valuation for investors based on companies' market valuation in 2015 was at 1,4x, 0,3x lower than the increase of Nasdaq in 2013 of 1,7x. By considering only high tech companies that were already Unicorns during the pre IPO process is still possible to observe the same results and the winners are LinkedIn, Workday, Fireye and Facebook. From the above data it is clear that a high valuation of Unicorns in the private market leads to lower upside gain for investors after IPOs. The more a company is valued in the private market, the more mixed are the possibilities to have an even higher valuation in public markets. What it seems, is that the metrics that are being used in private markets for valuing these companies are different from the ones that public markets use, otherwise it should be possible to observe skyrocketing valuations also in the public markets for

these companies. The Dot-Com bubble has given a severe hit to the global economy and markets seem to have learned from it, and as it has been said above, technology companies are now trading slightly below average historical valuations. However, there seems to be a mismatch between the mechanism that first fuels the growth of companies in their early years up to the point that they are ready to float in public markets. What has been observed since 2010 has been an increase in the number of pre-IPO funding rounds for private companies, with the average size of these investments that has more than doubled between 2013 and 2015. A major concept that must be taken into account at this moment is that economy has become global at almost every level. If in the 2000s only USA was the leading world economy, now also China is strongly taking its position at the top rows. This means that there has been an increase in the circulation of money, in competition and an opening of new markets (mostly in China) that have proofed to be as large as the western markets combined in some cases. Hence, in the last years it has not be uncommon to see Chinese companies reach skyrocketing valuations, with valuations' increases for these companies up to 5 times in a single year. What comes out from this scenario is that there is plenty of cash that is searching for investment opportunities in a bullish way, flooding with cash any potentially profitable business opportunity. The amount of uninvested but committed funds in the technology industry globally surpassed $ 100B in 2012 and in 2015 surpassed $ 150B, the highest level ever. What has fuelled this abundancy of cash has been also the entrance in private markets of new types of investor (institutional and wealthy individuals) that have been mainly interested in the later stages of funding of these companies - closer to the IPO or exit stage. Given the high level of funds provided by these new investors, now Unicorns are staying private more than before,

precisely on average three times longer. In 1999, the average age of US tech companies that went public was of 4 years according to Jay Ritter, a professor at the University of Florida who is specialized in public markets. Between 2004 and 2015, of the 35 companies that reached and surpassed the 10bln valuation threshold, only 6 achieved this valuation level before going public. For the others it took on average 8 years post IPO. What is being observed now is that high tech companies are increasingly reaching $ 10B and over of valuation without the need to go private.

Currently, high tech start-ups are at least waiting to have accounting profits. Between 2001 and 2008 fewer than 10% are the IPOs made after that a company had reached profitability. By 2010 almost 50% of the companies had at least reached the break-even point for profits/expenses. Actually, the number of high tech companies going public has remained stable since the 1990s, but the capitalization size at the IPO time has more than doubled. In 2014, the average number of years for tech companies to go public was 11 years, with a cumulative amount of financing rounds that are generating an increasing number of Unicorns and Decacorns. One of the reasons for the longer period that these companies remain private is also due to new policies that have been enacted especially in the USA: the US Jumpstart our Business Start-ups (JOBS) Act. It passed in 2012 as a new law and it increased by four times the number of shareholders that a company can have before it has to disclose its financial statements. Furthermore, since 2013 the capital invested in tech companies in the private market has increased drastically from $ 26B to $ 75B in 2015. Another important consideration is the fact that public markets assign higher multiples at the moment of IPO and afterwards, with also better performances, to companies that are larger, with higher valuation, compared to those that are smaller. Yet, there are no doubts that at a

certain point these investors will require an exit and cash in on their investments, but for what it seems now, it is still not the time. What will happen at a certain point is that these Unicorns will need either to go public or to be acquired by a listed company, and crucial will be their valuation at that point in time. Two different scenarios could emerge if it will still exist a mismatch between valuations in public and private markets: the first scenario, and the most realist one, is that these Unicorns will start gradually to go through down rounds of funding with lower valuation levels up to the IPO date. Instead, the second scenario is that the valuation in the private markets will continue on the exact same path they are now on and at the moment of the IPO, these companies will see a drastic drop in their stock price due to excessive valuation to which they have been offered to the public. It is clear that the second scenario is the most wealth destroying one as losses could be severe. However, the first scenario is the most probable one as already some Venture Capital late stage investors like Fidelity and T. Rowe Price have marked down investments in some Unicorns from 10% to 50 %. It is becoming also extremely common to see high tech start-ups IPOs that rise less capital than their last stage of pre-IPO funding round. These also means that the market in unwilling to assign excessive valuations to businesses that could potentially generate abnormal returns in the future, but that the most of them still didn't turn profitable. So far, in the last three years, 61 companies have gone public with a valuation of $ 1B or above, and the median that they are currently trading is around 3% their listing price. For some Unicorns, their trading is also lower, like for Twitter or Alibaba. What is interesting also to notice is that between 1997 and 2000, there have been as many as 898 IPOs of technological US companies, with an overall valuation of $ 171B. However, by 2015, also due to the burst of the Dot-Com bubble, only 303

survived. By 2010 of this 303 companies only 128 remained. These companies between 2000 and 2010 they have received an average share price return of -3.7%/year. Between 2010 and 2015 returned -0,8%/year. Hence, there are little doubts over the fact that valuations of Unicorns have been inflated due to exuberance of private equity investors. Due to abundancy of funding and market euphoria, there are vibrant signals that there could be a bubble. Yet, it is still early to say what private equity funds will do, either continue to pour money in these companies or start devaluating them. By looking at the mechanisms behind valuations, throughout the different financial crisis that have followed over the years, valuation issues have always played a central role in the rise and collapse of many stocks. The amount of cash that investors piled into certain stocks over others has significantly raised the solidity of how valuations are done. Going back to the current situation, where investors are giving to high tech start-ups big piles of money, also the SEC in 2015 has started investigating how mutual funds assigns so varying valuations to high tech companies[35]. For sure, it is not possible to use any type of valuation method for Unicorns for several reasons: negative returns, good benchmarks missing and scarce solidity of some models that cannot fully assess the true value of a start-up. A method that can be tailored on the target company and that gives a reliable valuation estimate is the Discounted Cash Flow Model (DCF).

The DCF model is able to capture the unique value of high tech start-ups by taking into account different inputs like market and industry developments, growth of the

[35] It was one of the objectives to assess the valuation of Uber, Snapchat and/or Xiaomi and compare them to current valuations. However, after extensive research with Eikon Thomson Reuters, Bloomberg Professional, LexisNexis Academic and Company Dossier, Factiva, Osiris and Orbis, it has not been possible to find financial data for these companies. The main reason is that these companies, as being incorporated in the US, are not obliged to disclose financial information to the public.

company, penetration rate and company's operational characteristics. The key assumption to have the DCF model work for start-ups is to not to focus on past performances of the company, but rather at the long term development of the market in which the company operates in and then look backward to derive the current valuation. In this way is possible to capture also the intrinsic potential of the start-up that historical data cannot show. The first step is to understand the evolution of the company from a hyper-growth state into a stable long term growth and the time period. Usually, it can be taken as a ballpark number a time lapse of 10-15 years before a start-up moves into a stable long-term growth. Thus, firstly it has to be assessed the company satisfies customers' needs and then how the company generates money. The way a company generates money is crucial for the fact that even great business ideas don't always translate into a solid business model that is able to generate revenues. By taking into consideration both aspects, it is then possible to estimate the size of the potential market. For example, Uber satisfies customer needs by offering an ultra-rapid taxi and limo service, thus matching the demand of mobility of people with the supply of taxis and limos that are waiting for a new customer. The way Uber makes money is from a percentage of the revenues that drivers earn. Thus, the main market for Uber are taxi and limo services, which accounts for roughly $ 125B. However, Uber could also access adjacent markets like car rentals, mass transit and car sharing. By adding up the current market for taxis and limos with the market size of the adjacent markets the total target market that is open to Uber is around $ 310B. It is difficult to estimate how much Uber will be able to capture of the total target market but, it is possible to assume that as the number of runs that drivers make with Uber increase, thus users of Uber services, also prices could decline by still maintaining a high operating margin.

Thus, the number of users in each market could increase due to lower costs. The next step is to forecast the number of users that will access the product and the estimated revenues per client in the future. To evaluate the growth rate of these two inputs is possible to use historical data and competitors' growth rates. By multiplying these two inputs is possible to obtain the revenue that will be generated 10-15 years from now. Subsequently, the forecasted revenue must be verified by forecasting the potential market in the future. The growth rate that will be used to estimate the future market size must also reflect the high level of uncertainty, thus is advisable to be conservative when choosing the rate. The last step at this point is to compare the revenues that the company will make in 10-15 years with the forecasted market size at the same time and extrapolate the relative market share. The following steps are to find the long term operating margins, the capital investment needed to grow the business and the return on invested capital (ROIC). These inputs are needed to find the relative cash flows for future years. To assess the operating margins is useful both to look at historical data of the company and the ones of competitors and of similar companies that have a similar business model. Furthermore, it can be assumed that for Internet companies the capital investment in fix equipment will be low. It is useful to assess the percentage of capital invested by other peer companies as a proxy for the company that is being valued. Regarding the ROIC, it must be taken carefully as for Internet companies ROIC can be extremely high and lead to misleading results. It is not uncommon to find Internet companies that as soon as they turn profitable, their ROIC reaches high figures. Subsequently, it is needed to match the forecasts derived so far to the current performances of the company and the speed of transition from present to future (e.g., for how long fixed costs will be higher than variable costs or/and how long it will take

for revenues to grow faster than capital raised). To assess the transition and the speed it must be analyzed the progression of similar companies on historical trends. The problem that could emerge is that for high tech companies, long term investments lies mainly in intangible assets, and these investments must be expensed under current accounting rules; leading to understated accounting profits. As is possible to observe, the majority of input's forecasts done are made with best-guess estimates, peers' analysis and market trends as well as a company performance. Hence, there is a clear problem of uncertainty that could lead to misleading valuations. To lower uncertainty, it is useful to use weighted-scenarios methods to take into account alternative evolutions of the business environment. When using weighted-scenarios, it is useful to assess financial data both in an optimistic and pessimistic way. Moreover, each scenario will need to be weighted by a probability of occurrence. These probabilities are subjective and difficult to be backed up by real word data. Yet, it is crucial to give to each scenario reasonable probabilities to avoid distorted scenarios. A reduction in the probability of one of the scenarios leads to a big reduction in the final valuation of the company. Thus, these probabilities should be adjusted to historical performance of other similar companies. It is clear that for young high tech companies' uncertainty is extremely high with respect to mature companies. This is also why young companies' valuations tend to be highly volatile. The main reason lies in the fact that it is impossible to predict which start-ups will be winners and which will be losers. Moreover, it is also hard to predict if private equity investors will start down rounds for Unicorns that are considered overvalued, or if high valuations will continue. Since both private and public investors could be affected by these inflated assets' valuation, also the SEC in 2015 has begun to investigate how these companies are valued. By

looking at the rationales behind Unicorns and their astronomic valuations, it is possible to find the concept of "creative disruption". Their innovative force is believed by investors to bring an exponential growth to society's welfare and consequently also high returns for them. Nevertheless, these Unicorns are also disrupting traditional industries and markets. The value added that these companies bring must be accurately understood as valuations should be based on the true value that companies create. It will be interesting to see if corrective actions will be taken by policymakers or directly by market players before euphoria, like in the Dot-Com bubble, spreads also to public markets and losses start to pile up. Similarities with the 2000 tech bubble are various, from the abundancy of capital to private market euphoria for future years. For investors will be crucial to assess which companies are true winners and which are not, directing their money to Unicorns that have a real competitive advantage, leaving the losers to vanish in time.