# **The LUISS**

Department of Business and Management Chair in Equity Markets and Alternative Investments

# "The long-awaited Airbnb-IPO: money left on the table in tech listings in a year marked by a global pandemic"

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# Abstract

In the midst of a global pandemic, equity markets in the United States ramped, causing stock indexes to reach new all-time highs only few months after the after the contraction of the MSCI World Index by 34% between February and March 2020. Backed by FED expansionary monetary policies and government fiscal stimuli, retail investors flooded into the markets, propelling equity valuations to levels previously seen during the dotcom bubble. The IPO market boomed and the so-called IPO discount reached an average of 41.6%. Airbnb, the renowned short-term rental company, experienced a share price increase of more than 110% in its first day of trading following the IPO, more than doubling its market capitalization in a matter of hours. Through the analysis of the American IPO market and the comparison with the dotcom bubble of the late nineties, this thesis shows that companies are indeed overvalued and the abnormal share price pops in the first day of trading following an IPO are mainly caused by retail investor activity. In addition, low interest rates environment and quantitative easing measures leave market participants with no investment alternatives other than stocks. With regards to Airbnb initial public offering, valuation methods employed in this study highlight that the company's fundamentals are in line with the IPO offer price target range but substantially unterhered from the current market share price, suggesting a contraction in the near future.

*Keywords:* 

Initial Public Offering

**IPO Underpricing** 

Money Left on the Table

Airbnb

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# 1 Introduction

During 2020, a particular year for financial markets due to COVID-19, in the United States 165 companies were listed on the NYSE and the NASDAQ, raising in total \$61.9 billion. At the end of their first day of trading, the shares traded on average at 41.6% above the price at which the company sold them during the IPO, leaving an aggregate amount of "money left on the table<sup>1</sup>" of approximately \$29.7 billion.

Considering the fact that from 2009 to 2019 the average first-day return was 16.0% and the amount of money left on the table was on average \$4.2 billion each year for an average of \$28.6 proceeds raised, it is evident that 2020 was a particularly dazzling year for equity markets. However, these abnormal price surges on the first days of trading stirred tormented memories of the well-known dotcom bubble, warning investors of potential frothiness in a too hot market.

Airbnb, the famous short-term rental online platform, went public on the 10<sup>th</sup> of December 2020, with an IPO offer price of \$68. At the end of its first day of trading, its shares traded at \$144, implying a 113% share price increase.

As it can be seen from Figure 1 below, only three other companies<sup>2</sup> faced such a sharp share price increase on the first day of trading – and that happened in the peak of the dotcom bubble.

During 2020, other "tech companies" IPOs experienced strong share price appreciations, as in the case of Snowflake in September and DoorDash just one day before Airbnb IPO, highlighting signs of valuations untethered from corporate earnings.

<sup>&</sup>lt;sup>1</sup> Money left on the table is defined as the difference between the price at the end of the first day of trading minus the IPO offer price, all multiplied by the number of shares sold in the IPO.

 $<sup>^2</sup>$  Raising at least \$1 billion in proceeds .



Share Price Increase in the First Day of Trading

Figure 1 – Highest share price increase (in percentage terms) on the first day of trading (Financial Times, 2020).

Thus, the purpose of this thesis is to study and eventually explain the reasons why, in 2020, United States equity markets overperformed initial expectations, with indexes reaching new alltime highs amid a global pandemic and IPO underpricing soaring to the levels previously seen only in the late nineties, ultimately questioning whether the stock overvaluation we are witnessing today can result in a bubble.

# 2 IPO Process

In this chapter, a quick overview of the IPO process will be explained in order to familiarize the reader with the topic. Firstly, pros and cons of going public will be presented. Secondly, the entire IPO process will be analyzed with the purpose to highlight how advisors and issuers eventually come with a final offer price.

# 2.1 Why a company goes public?

The first question one should ask when talking about IPOs is "why companies decide eventually to list their shares into a publicly traded environment?". As a consequence, the management of the company should carefully evaluate the pros and cons of going public before embarking on this journey.

In order to correctly answer to the question above, one should first define what IPOs are. IPO stands exactly for "Initial Public Offering". Initial suggests that something is happening for the very first time, public suggests that the company will no longer be held by "private investors" and offering suggests that something is being offered to someone. As a consequence, the IPO process is exactly the process of selling for the first time existing shares (also called "secondary shares") or newly issued shares (also called "primary shares") to the public that will eventually be traded on a regulated stock exchange.

Thus, through this process, the company is able to receive cash if primary shares are sold or existing shareholders are able to monetize their initial investment if secondary shares are sold. Therefore, the reasons why companies decide to list their shares should be now more evident.

For example, if a company wants to expand its business through the implementation of new projects, it might raise the necessary proceeds through an IPO, accessing to public equity capital and eventually lowering cost of funding (Ibbotson & Ritter, 1995). Another reason might be the will of existing shareholders to sell their shares and monetize part or the entirety of their initial investment. An example might be provided by private equity funds that wish to cash in their

investments through the sale of existing shares via an IPO process (Povaly, 2006). In addition, going public might provide indirect benefits such as the additional visibility and publicity that might attract talented employees and management (Ljungqvist, 2004). Figure 2 below summarizes the main reasons why companies decide to list their shares to the public.





Unfortunately, going public does not provide only benefits. As Ibbotson & Ritter (1995) point out, there exist costs associated with the regular publication of information necessary for publicly-traded companies. Moreover, there are other costs, that can be either direct or indirect, associated with the IPO process itself. As a matter of fact, direct costs might include underwriting fees, legal expenses and so on. On the other hand, indirect costs are associated with the time and effort the company and the management spend during this articulated process.

For the above-mentioned reasons, IPOs represent a crucial phase in a company's history (PwC, 2010). In order to be successful, i.e., to raise the required proceeds and ensure a stable and raising aftermarket, IPOs must be planned carefully, starting from selection of the right advisors, and ending with a positive aftermarket share price performance. In the following sub-chapter, the IPO process will be presented in order to highlight its peculiarities and introduce the "underpricing" phenomenon as a mechanism to promote aftermarket stability.

# 2.2 IPO Execution Process

Fleuriet (2008) states that there are three substantially different methods to perform an IPO. An issuer might decide to use either an auction, a fixed-price offering, or a book-building process. The first two methods are rarely used, while the book-building process is the most common method used by underwriters (Gauvin & Power, 2019). For this reason, in this thesis the focus will be on the last method, as it is the most widely used.

In general, the IPO process can be summarized into 6 different blocks, as shown in the Figure 3 below.



Figure 3 - IPO standard milestones

In the "syndicate selection" phase, the issuer select the underwriters that will compose the syndicate. The latter will vary depending on the specific type of equity offering.

In the "preparation phase" the investment banks appointed organize the IPO timetable and perform initial valuations. The key document of this phase is the "prospectus", a document that contains the description of the company, the issuer's historical financial statements, the management of the company, etc.

Then, in the next phase of the process, the "analyst presentation and research phase", the issuer's management team have the opportunity to present the company's investment case. It should be noted that the content of the presentation should be materially consistent with the previously drafted prospectus. On the basis of this presentation, the research division of the investment bank will prepare the pre-deal research report, a document containing the equity story of the issuer that will be used in the marketing phase.

In the "investor education phase" investment bank analysts start to educate potential investors with the final purpose to determine the key investors to meet during the roadshow phase, to assess the initial reaction to the equity story, and to assess potential valuation issues.

The next phase is divided into two activities that take place almost simultaneously. In the "roadshow" the issuer's management has the opportunity to meet potential investors and deliver the equity story. The second activity is the previously mentioned "book-building process". As the name suggests, investment banks "build a book" of offers from potential investors before actually pricing shares. This is done first by "testing the interest" of potential investors. In parallel with the roadshow, interested investors are invited to provide indications on the quantity and price of shares they want to buy. Although indications are not binding, investors rarely decide to eventually renounce their bids. With this information on hand, underwriters are able to construct a demand curve and eventually price the offering accordingly. Generally, the price is set at a level in which the demand exceeds the supply and the underwriter, together with the issuer, allocate the shares at their own discretion (Cornelli & Goldreich, 2001).

In this last phase "the pricing, allocation, and settlement", the investment bank must ensure a positive and stable aftermarket of the share price. This can be done through the "green shoe option". With this method, the underwriter oversells the issue by borrowing the additional shares (up to a maximum of 15 percent of the offering). If the aftermarket is positive, i.e., the share price increases, the underwriter will exercise the option and buys borrowed shares from the issuer at IPO price. In this situation the issuer raises additional proceeds and the bank makes no gain, since shares are sold at issue price and bought at issue price. If the aftermarket is negative, i.e., the share price decreases, the underwriter will not exercise the green shoe option, thus he will close his short position by buying shares back in the market (thus supporting the share price) and deliver them back to the issuer. In this situation, instead, the issuer does not raise additional proceeds but the underwriter makes a gain since the shares are sold at issue price but are bought back at a lower price (Aggarwal, 2000).

## 2.3 How to Value an IPO

The process of valuing the issuing company is one of the most critical phases in an IPO. The theoretical value of a firm is the parameter by which the different counterparties base their expectations (Vulpiani, 2014). In this chapter, valuation methods used in order to value a company will be briefly described, focusing specifically on the valuation of companies that want to go public.

From a theoretical point of view, there are three broad categories of methods employed in order to value a company. It is possible to use financial methods, market methods, and asset-based methods. Financial methods and asset-based methods are based on the intrinsic characteristics of the company under valuation. On the other hand, market methods, as the name suggests, are based on external characteristics, such as comparable companies.

When dealing with firms conducting IPOs, most of the times the issuing companies will be relatively young, thus forecast future cash flows will be a very hard task. As a consequence, market methods based on comparable companies are preferred over financial methods such as discounted cash flows or adjusted present value methods. However, a comprehensive valuation, wherever possible, will provide a better view on the final valuation range. A study conducted by Roosenboom (2012) shows that 87.3% of underwriters use comparable firm/transaction multiples. The most common multiples used are price-earnings ratios, price-to-cash flow ratios, price-to-sales ratios, and enterprise value ratios. Tied for second (in both cases 59.2% of underwriters use them) are discounted cash flows and dividend discounted models.

Figure 4 below summarizes the most common valuation methods employed in IPOs, highlighting also how the pricing process works.



Figure 4 – IPO valuation and pricing process (Roosenboom, 2012).

In the next two sub-chapters, a brief theoretical explanation of the multiple valuation methods and discounted cash flow valuation method will be presented as those methods will be employed in order to analyze Airbnb IPO. Furthermore, in the next chapter, the IPO underpricing phenomenon will be addressed.

#### 2.3.1 Discounted Cash Flow Method

The discounted cash flow (DCF) method is the most used amongst financial methods. The latter are methods justified by the empirical evidence that exists a correlation between the values measured by the stock market and the cash flows generated by the business. In other words, the real driver of value for a company is the cash flows that the company is able to generate (hence the expression "cash is king"). As a consequence, in the DCF method, the value of a company is simply calculated by discounting the future cash flows generated by the company assuming the absence of debt ("unlevered cash flows"), i.e., without considering the effect of leverage generated by debt. Since it is not possible to forecast all the cash flows a company will generate to infinity, the DCF method is split in two parts.



#### Formula 1 - Discounted Cash Flow Method Formula

As Formula 1 above shows, in the first part the cash flows of the explicit period are discounted with the appropriate discount rate. In the second part, the terminal value, i.e., the value of the company assuming it will last from the explicit period to infinity, is calculated using the growing perpetuity formula. In this way, the final value of a company can be thought as the sum of the value of the company assuming it will operate for the next 5-10 years and the value of the company assuming it will operate from year 5-10 to infinity. All the cash flows are duly discounted with the appropriate discount rate, which can be calculated as shown in the Formula 2 below.

	<b>K</b> <sub>e</sub> = Cost of Equity
	$W_e$ = Weight of Equity
$WACC = (K_e \times W_e) + (K_d \times W_d) \times (1 - t)$	$K_d = \text{Cost of Debt}$
	$W_d$ = Weight of Debt
	t = Tax Rate

Formula 2 - Weighted Average Cost of Capital Calculation

The discounted rate used is the weighted average cost of capital (WACC) and it represents the return required by those who finance the company through equity and debt. In fact, the WACC is a weighted average of the cost of equity and the cost of debt for that specific company.

The final value obtained will be the enterprise value of the company, i.e., the value of the company considering all the assets and debts. In order to obtain the equity value of the company, and eventually the share price, the net debts (debts – cash) of the company must be deducted from the enterprise value. The intrinsic share price of the company (not necessarily the company's market share price) is then calculated by dividing the equity value by the number of total shares outstanding. Figure 5 below summarizes this process.



Figure 5 – From Enterprise Value to Equity Value

#### 2.3.2 Multiple Method

The second most method used to value a company is based on multiples. Through this method the enterprise value (or the equity value) of a company is calculated simply on the basis of specific multiples of certain key economic measures, such as revenues, EBITDA, net income, etc., that are taken from comparable companies in the market. In order to be considered comparable, a company should be listed and should operate in the same sector/industry as the company to be valued. Formula 3 below express the process to calculate the value of a company.

# *Firm Value = Multiple × Determined Economic Business Measure*

#### Formula 3 - Firm Value Calculation Through Multiples

The choice of the multiple is very important as different sectors might have different accounting measures as value drivers. As an example, a startup company might have negative earnings, thus revenues multiples should be used instead of net income multiples. In general, as Roosenboom (2012) points out, the most used multiples in IPOs valuation in US are the one displayed in Table 1 below.

Multiple	Numerator	Denominator	Percentage of underwriters using this method
P/E	Market Capitalization	Net Income	83.77%
P/CF	Market Capitalization	Cash Flow	41.23%
EV/Sales	Enterprise Value	Revenues	24.56%
P/BV	Market Capitalization	Book Value	16.23%
Other Ratios	n/a	n/a	7.02%

Table 1 – Most used multiples in IPO valuation in US (Roosenboom, 2012).

Once the panel of comparable is determined and the appropriate multiples are calculated for each company, in order to obtain the enterprise value of the company under valuation one should compute for example the average of the EV/Sales multiple of the comparable companies and simply multiply this number by the Revenues of the company.

# 3 IPO Underpricing

IPO underpricing, or "money left on the table", is a well-known phenomenon studied in the existing literature. Empirical evidence tells us that when a company goes public, the issue price tend to be actually underpriced, resulting in a substantial share price increase on the first day of trading (Ljungqvist, 2004).

Period	Number of IPOs	Mean First-Day Return	Aggregate Amount of Money Left on The Table (in billions)	Aggregate Proceeds (in billions)
1980-1989	2047	7.2%	\$3.30	\$53.99
1990-1998	3614	14.8%	\$30.07	\$222.38
1999-2000	856	64.6%	\$66.79	\$129.47
2001-2020	2258	16.7%	\$101.57	\$592.02
1980-2020	8775	18.4%	\$201.73	\$1,001.86

Table 2 - Mean First-day Returns and Money Left on the Table, 1980-2020 (J. R. Ritter, 2020).

In order to present the phenomenon, Table 2 above lists the companies that went public from 1980 to 2020 present in the CRSP<sup>3</sup> database. On the rows are aggregated different periods, from 1980 to 1989, from 1990 to 1998, from 1999 to 2000 (dot-com bubble year), and from 2001 to 2020 (the full table can be found in the Appendix in the section 9.1). On the column, instead, is possible to find the number of IPOs for that particular period, the average equal-weighted first-day return (thus calculated by not giving specific weights depending on the proceeds raised), the aggregate amount of money left on the table, and the aggregate proceeds.

<sup>&</sup>lt;sup>3</sup> The CRSP US Stock Databases contain daily and monthly market and corporate action data for over 32,000 active and inactive securities with primary listings on the NYSE, NYSE American, NASDAQ, NYSE Arca and Bats exchanges and include CRSP broad market indexes.

It can be easily seen that, excluding the specific period during the dot-com bubble, in which firstday returns substantially increased, IPOs from 1980 to 2020 were underpriced by approximately 18.4% and an aggregated amount of \$201.73 billion were left one the table.

Dollar amount left on the table	Company	IPO Date	Offer Price	First Closing Market Price	First-Day Return
\$5,075,000,000	Visa	19/03/2008	\$44.00	\$56.50	28.41%
\$3,937,028,063	Airbnb	10/12/2020	\$68.00	\$144.71	112.81%
\$3,750,040,000	Snowflake	16/09/2020	\$120	\$253.93	111.61%
\$2,887,830,000	DoorDash	9/12/2020	\$102	\$189.51	85.79%
\$1,852,500,000	Coupang	11/3/2021	\$35.00	\$49.25	40.71%
\$1,597,240,000	UPS	10/11/1999	\$50.00	\$68.25	36.50%
\$1,539,512,500	Corvis	28/07/2000	\$36.00	\$84.72	135.33%
\$1,496,000,000	Snap	2/3/2017	\$17.00	\$24.48	44.00%
\$1,365,500,000	Bumble	11/2/2021	\$43.00	\$70.31	63.51%
\$1.323.000.000	Twitter	7/11/2013	\$26.00	\$44.90	72.69%

Table 3, instead, highlights the ten IPOs with the highest amount of money left on the table.

Table 3 - Highest Amount of Money Left on The Table in IPOs by Firm (J. Ritter, 2021).

Interestingly enough, 5 of the 10 IPOs with the highest amount of money left on the table are of companies that went public in the last quarter of 2020 or in the first quarter of 2021. Even more interesting is the fact that these 5 companies (Airbnb, Snowflake, DoorDash, Coupang, and Bumble) are all companies that can be defined as "tech companies<sup>4</sup>". The next chapters of this

<sup>&</sup>lt;sup>4</sup> "Technology", in this context, has come to mean primarily electronics-based technology. This can include, for example, business relating to digital electronics, software, and internet-related services, such as e-commerce services (TechNation).

thesis will be devoted to the analysis of this phenomenon, especially focusing on Airbnb, with the purpose to eventually explain why underpricing is increasing in this period.

However, before proceeding to the analysis, it is important to take a step back and try to explain why the underpricing phenomenon exists and whether there are theories addressing this fact. For this reason, the next sub-chapters will dive deep into the theories regarding IPO underpricing, highlighting potential explanation reasons that will be eventually useful in the analysis of Airbnb listing.

During the years many theories were developed, as Jamaani & Alidarous (2019) pointed out. The Figure 6 below lists the main theories present in the literature.



Figure 6 - List of IPO Underpricing Theories (Jamaani & Alidarous, 2019).

Unfortunately, a complete review of all the theories will be outside the scope of this thesis, thus the next sub-chapters will highlight only the main ones of each block (information asymmetry theories, institutional theories, ownership and control theories, and behavioral theories).

#### **3.1 Information Asymmetry Theories**

The majority of the studies performed attribute to "asymmetric information theories" one of the main reasons of IPO underpricing (Katti & Phani, 2016). Asymmetric information simply means that one of the parties involved in the process knows more than the others. Since in an IPO the key parties are the underwriting bank, the issuing firm, and the investors buying the new shares, these theories state that one party, for example the issuer, possesses more information than the other party, for example potential investors interested in participating in the IPO.

Based on the well-known Akerlof (1970) lemons problem, one of the most famous asymmetric information model in the IPO underpricing context is the "winner's curse" by Rock (1986). He argues that some investors possess more information, i.e., are better informed about the true value of the shares, than other investors, the underwriting bank, or the issuer. As a consequence, informed investors, which are often institutional investors that can bear the costs of information gathering, will bid only on attractive IPOs while uninformed investors will bid indiscriminately. The latter will then suffer the so-called "winner's curse" since they will receive all shares in unattractive offerings while in attractive offerings they will be partially crowded out by informed investors. Eventually, since uninformed investors will experience negative returns having invested only in unattractive IPOs they will exit the market, leaving only informed investors. However, Rock argues that informed investors are not enough in terms of demand to take up all shares even in attractive offerings. As a consequence, in order to make all IPOs attractive, i.e., make IPOs experience positive returns, to the whole plethora of investors, all IPOs must be underpriced in expectation. Informed investors will still have an advantage; however, uninformed investors will no longer expect to make losses on average. Individually, it is costly for a company to underprice its shares since less money will flow in its pockets (money will be "left on the table"). On the other hand, issuers benefit collectively from underpricing offerings, as uninformed investors will continue to participate in the market.

Another example of information asymmetry theory (principal-agent) is brought by Baron (1982). In his work he suggests that since underwriters possess more information on the market conditions and on the potential demand for the issuer's shares, they tend to underprice the offering in order to spend less on marketing expenses and, at the same time, allow investors to experience positive aftermarket returns. Being in a position of disadvantage, the issuer is forced to accept this underprice.

#### 3.2 Institutional Theories

As illustrated in the Figure 6 above, under institutional theories it is possible to categorize three different institutional-based theories. In this sub-chapter the first two will be discussed, as the last one does not find empirical evidence in the U.S. market.

The first one, the so-called "lawsuit avoidance", states that IPO issuers underprice deliberately offerings in order to reduce and avoid the potential litigation risk from disappointed investors in the aftermarket performance. These lawsuits will not only represent a direct cost for the issuer, they will also damage indirectly the company by affecting its reputation (Jamaani & Alidarous, 2019). However, it is important to mention that this model finds empirical evidence only in the United States, as the existence of a "litigious culture" can be found among American investors. Therefore, studies conducted in other countries such as U.K., Japan, Switzerland, Finland, Sweden, and Australia highlight the absence of this phenomenon.

The second one, the "price stabilization" theory, is based on the fact that underwriters offer price support (through the repurchase of shares, thus pushing the price of shares up) in poorly performing IPOs. As a consequence, the commitment of underwriters to repurchase shares at the offer price bonds against deliberate overpricing (Lewellen, 2006).

#### 3.3 Ownership and Control Theories

Based on the ownership and control separation principle (the misalignment between managers and shareholders), two theories emerged. The first one, called the "entrenchment managerial control" states that IPO underpricing is a tool used in order to increase ownership dispersion and thus maximize the control over the firm (Shleifer & W. Vishny, 1989). A widely dispersed shareholders base is translated into reduced external monitoring, that eventually leads to management entrenchment in the company. The "agency costs" theory, on the other hand, contradicts the first theory. Due to the separation between owners and managers, underprice serves as an incentive to attract large block-holders that will internally monitor managers and eventually minimize agency problems, increasing shareholders value in the long-run (Brennan & Franks, 1997).

## **3.4 Behavioral Theories**

Behavioral theories find their explanations in the presence of "irrational investors" in financial markets. In one of his works, Welch (1992) develops a model in which he shows that "informational cascades" can occur amongst IPO investors. Since IPO investors formulate investment decisions sequentially, later investors will disregard own information and, acting irrationally, will invest only because they think earlier investors possess favorable information.

# 3.5 Why Don't Issuers Get Upset About Leaving Money on the Table in IPOs?

After having presented in the above sub-chapters all the theories related to IPO underpricing, it is important to ultimately explain why in general issuers are not upset about leaving money on the table. Table 4 below summarizes the effect of underpricing on the wealth and ownership of pre-issue shareholders<sup>5</sup>.

	Strategy 1	Strategy 2
Offer Price and # of Shares Offered	39m at \$10.0	30m at \$13.0
Market Price Per Share	\$12	\$13
Money Left on the Table	\$78 m	zero
Post-issue Shares Outstanding	117 m	108 m
Post-issue Wealth of Pre-Issue Shareholders	\$936 m	\$1,014 m
Post-issue % of Firm Owned by Pre-Issue Shareholders	66.7%	72.2%

Table 4 – Effect of Underpricing (Loughran & Ritter, 2002).

As it can be seen from the example provided above, in the case of no money left on the table, less shares are sold (as demand is less because price is naturally higher) but the post-IPO wealth of pre-issue shareholders is higher, while dilution is lower. To give more numbers, from July 2009 to June 2019, approximately \$43 billion was left on the table and the average amount of money left on the table is more than twice the fees paid to underwriters (Loughran & Ritter, 2002). In the United States, these fees amount on average to 5.4% of the total offering (Statista, 2017). Considering the example presented above, why then underwriters and issuers are willing to leave money on the table, thus making IPO investors such as institutional investors, hedge funds, etc. gain profits from the share price increase?

As Loughran & Ritter (2002) point out, it is favorable for underwriters to leave money on the table because potential investors will compete for final allocation. As a consequence, since many IPOs are oversubscribed, underwriters will be able to choose to which potential investor allocate the shares. At first, it might seem that by underpricing shares, underwriters will receive less fees since

<sup>&</sup>lt;sup>5</sup> Assumptions: pre-issue shares outstanding - 78m shares; gross proceeds of IPO - \$390 m; post-issue market cap - \$1,404 m; # of shares sold by pre-issue shareholders - zero.

proceeds will be lower. However, three benefits might be identified in an underpriced IPO: first of all, low IPO offer price will reduce underwriter's marketing costs, as it will be easier to find potential buyers; secondly, potential buyers might overpay in commissions to be sure to receive the shares; thirdly, underwriters minimize the risk of having shares unallocated when the price is more attractive (therefore avoiding keeping shares on their books and be subject to market risk).

The consequence is that there is a conflict of interest, as underwriter's incentives (to receive the most money possible in fees) are misaligned with those of issuers (i.e., to raise the most amount of money possible). Based on the data on money left on table by J. Ritter (2021), if potential investors are willing to overpay (soft dollars<sup>6</sup>) on commissions 30 cents for every \$1 of money left on the table, a \$1 increase in the offer price will provide underwriters 7 cents in revenue fees but a loss of 30 cents in soft dollar revenue. That explains also why empirical evidence shows that in bookbuilding IPOs, underprice is higher. In fact, in auctions or direct listings, underwriters do not have the possibility to allocate shares to the most profitable clients, i.e., those who will pay more in commissions in order to get the shares.

We have seen that it is convenient for underwriters to underprice IPOs, what about issuers? Are they upset for leaving money on the table?

In order to answer the above question, prospect theory comes to play. In this specific context, prospect theory assumes that issuers are interested in the change of their wealth rather than the level of wealth. In most IPOs, issuers will sum the wealth loss deriving from the money left on the table and they will compare it with the wealth gain deriving from the share price increase deriving from initial underpricing.

<sup>&</sup>lt;sup>6</sup> Soft dollars are additional fees paid to brokerage firms for additional services, such as research (Investopdia, 2020).

The example below in Table 5 highlights this phenomenon. Suppose in an IPO, 21 million new shares are sold at \$22 per share. The closing price in the first day of trading is \$31.21, thus implying an amount of money left on the table equal to \$193 million<sup>7</sup>. Of those \$193 million left on the table, suppose \$120 million came out from an existing shareholder.

Time Period	Stock Price	Shares Owned	Wealth			
Before Going Public	\$22	66.9m	\$1.34 bn			
First Closing Day	\$31.21	66.9m	\$2.09 bn			
Table 5 Ceridian HCM IPO (J. Ritter, 2021).						

As it can be easily guessed, the \$750 million gain in wealth completely offsets money left on the table. This is because prospect theory states that people value more the change in wealth (the sum of the gain and losses) rather than the single loss event.

To conclude this IPO underpricing chapter, it can be said that first of all issuers focus on the changes in wealth. Thus, they offset the opportunity cost of leaving money on the table, that in addition is treated as less of a cost compared to the direct cost coming from underwriter's fees (Loughran & Ritter, 2002), with the gain in wealth coming from the share price increase in the first trading day. Secondly, the misalignment of interests between issuers and underwriters is an incentive for the latter to underprice IPOs as they benefit from indirect compensation coming from soft dollars.

<sup>&</sup>lt;sup>7</sup> Money left on the table = (21m shares sold x \$31.21 closing price) - (21m shares sold x \$22 offer price)

# 4 IPO Activity in 2020

The purpose of this chapter is to analyze IPO activity in 2020 and compare it to previous years in order to assess the potential COVID impact in the stock market and eventually explain why tech listings are experiencing a sharp share price increase in the first days of trading.

Globally, as Figure 7 highlights, 2020 saw the highest amount of proceeds (€331 billion) raised in the last ten years, mainly driven by the increase of SPAC activity, for a total amount of 1415 IPOs





United States accounted for 53% of the total proceeds raised from IPOs, followed by China (17%), Hong Kong (10%), Brazil (3%), and United Kingdom (2%). Thus, the following analysis will review the performance of different markets and stock exchanges, eventually focusing on the US market.

In the first part, the European market will be analyzed, highlighting the listings and the aftermarket share price performance compared to market benchmarks. In the second part, the same analysis will cover the US market. The final aim is to focus on the differences of the two markets, considering also the different monetary policies employed due to the pandemic, in order

to explain why Airbnb and other specific tech companies overperformed initial share price expectations, leaving huge amount of money on the table.

Finally, in the last part of this chapter the dotcom bubble will be presented with the purpose to look for trends and analogies and eventually assess to what extent what is happening in the stock market today can be considered as an "irrational behavior" of retail investors or, even worse, as a bubble.

# 4.1 European IPO Market Overview

From 2010 to 2020, Europe has seen a swinging performance of IPOs in terms of volume and value.



Figure 8 – European IPOs from 2010 to 2020 (PwC, 2021).

As Figure 8 above shows, the peak was reached in 2015 after an upward trend that started in 2012, with 364 IPOs performed for a value of €57.4 billion. The following years saw different up and

downs. In terms of COVID impact in Europe, compared to 2019, 2020 saw more IPOs in terms of volume but with a lower value.

In order to better analyze this impact, Figure 9 below shows the performance in quarters of 2020 compared to the previous year.



Figure 9 – European IPOs in quarters of 2019 and 2020 (PwC, 2021).

As it can be seen, despite the lower proceeds raised in total compared to the previous year, 2020 saw an upward trend both in volume and value throughout the whole year, reaching the peak of 71 IPOs for  $\in$ 8.6 billion euros in the last quarter, a 42% increase of proceeds raised compared to the same period in the previous year.

In terms of the market in general, Figure 10 below highlights the performance of three main European indices (STOXX 600, FTSE 100, and DAX) in 2020. In order to make the comparison, index prices have been recalculated<sup>8</sup>. As it can be easily seen, in Q1 stock indices experienced a

<sup>&</sup>lt;sup>8</sup> Value in Base 100 =  $\frac{X_t}{X_0} \times 100$ 

sharp decrease due to COVID-19. As a consequence, IPO activity slowed, with 31 IPOs performed in the first half of 2020 compared to the 53 performed in the first half of 2019.

However, in the following months of 2020, STOXX 600 and DAX showed a strong recovery, ending up the year slightly below pre-pandemic levels. On the other hand, FTSE 100 lagged behind the other indices, ending the year substantially below pre-pandemic levels due to the constituent companies of the index and continuing Brexit trading negotiations (Hunter & Picard, 2020).



Figure 10 – European Indices Performance in 2020 (Base 100).

In the next sub-chapters, the performance of the European listings of 2020 will be analyzed, focusing on underpricing and aftermarket returns.

# 4.1.1 Main Listings in 2020

European top 5 IPOs raised €8.9 billion, an amount equal to the 44% of the European total proceeds raised in 2020.

	JDE Peet's NV	Allegro.eu SA	THG Holdings plc	Nordnet AB	Conduit Holdings ltd
Stock Exchange	Euronext Amsterdam	Warsaw Stock Exchange	London Stock Exchange	Nasdaq Nordic - Stockholm	London Stock Exchange
IPO Date	29/05/2020	29/09/2020	16/09/2020	25/11/2020	2/12/2020
Proceeds Raised (€bn)	2.59	2.32	2.04	1.02	0.91
Offer Price	€ 31.50	PLN 43.00	£ 5.00	SEK 96.00	£ 5.00
First-Day Return	€ 35.84	PLN 70	£ 6.25	SEK 105.00	£ 5.1
IPO Underpricing	13.8%	62.8%	25.0%	9.4%	2.0%

Table 6 below summarizes the results of the above-mentioned IPOs.

Table 6 - Top 5 IPOs of 2020 in terms of proceeds raised.

As it can be seen, in terms of underpricing only Allegro.eu SA experienced a very sharp share price increase in the first day of trading while the other companies were in line with underpricing empirical evidence presented in the previous chapters. In addition, Allegro.eu SA was the only company to price at the top of the price range, while the others priced within the range (PwC, 2021).

# 4.1.2 Performance of Main Listings

Much more interesting is the analysis of the aftermarket share price performance of the above IPOs.

Table 7 below highlights the 3-month share price performance calculated using arithmetic returns, consistent with previous underpricing calculations present in the literature, benchmarked with market indexes of the different countries<sup>9</sup>.

	JDE Peet's NV	Allegro.eu SA	THG Holdings plc	Nordnet AB	Conduit Holdings Itd
IPO Underpricing	13.8%	62.8%	25.0%	9.4%	2.0%
3-Month Performance (Offer Price)	19.2%	87.2%	33.8%	58.5%	8.0%
3-Month Market Performance	4.7%	15.0%	7.0%	45.0%	5.9%
Market Index 3- Month Performance	5.6%	22.1%	8.2%	4.67%	3.3%

Table 7 - 2020 Top 5 European IPOs 3-month share price performance.

As it can be seen, the analysis of the stock performance is split in two parts: in the first one, the 3month share price return is calculated on the IPO offer price (i.e., the price that IPO participants pays), in the second one, the 3-month share price return is calculated on the first day of trading closing price. Each share price is then benchmarked to its respective market index for the corresponding time frame.

Due to the underpricing phenomenon, obviously the 3-month share price performance on the offer price was higher compared to the 3-month share price performance on the first day of trading closing price (since all 5 companies experienced a share price increase in the first day of trading) and compared to market index performances. An interesting point is that the higher the underpricing was, the higher the 3-month market share price performance, a result in line with

<sup>&</sup>lt;sup>9</sup> JDE Peet's NV: AEX Index; Allegro.eu SA: WIG Index; THG Holdings plc and Conduit Holdings ltd: FTSE All-share Index; Nordnet AB: OMW Nordic 120 Index.

previous literature findings, with the only exception of Nordnet AB that had an underprice of 9.4% but a very high 3-month share price appreciation of 58.5%.

However, when we consider only the "market return", i.e., the return calculated on the market share price and not on the IPO offer price, things change. It is very interesting to notice that JDE Peet's NV, Allegro.eu SA, and THG Holdings plc, the companies with the highest underpricing, had a performance lower than their respective market indexes.

Company	Performance Measure	Share price	Market Index
JDE Peet's NV	Mean	0.08%	0.09%
	Volatility (St. Dev.)	1.33%	1.30%
Allegro.eu SA	Mean	0.32%	0.35%
	Volatility (St. Dev.)	4.11%	1.55%
THG Holdings plc	Mean	0.15%	0.13%
	Volatility (St. Dev.)	2.78%	1.18%
Nordnet AB	Mean	0.67%	0.08%
	Volatility (St. Dev.)	2.65%	0.74%
Conduit Holdings ltd	Mean	0.10%	0.06%
	Volatility (St. Dev.)	1.00%	0.91%

Table 8 – 2020 Top 5 European IPOs 3-month daily returns mean and volatility.

By looking at the daily returns in the same time frame displayed in Table 8 it is possible to observe that companies with higher underpricing experienced a much higher share price volatility compared to benchmark indexes. In addition, their 3-month average daily share price return was very close to the average 3-month market index return, resulting in an average or, even worse, a bad share price performance.

It is also very interesting to analyze and compare the share price behavior of the first three months following the IPO, as displayed in Figure 11 below.



Figure 11 – 2020 Top 5 European IPOs: rebased share price performance of the first 3 months of trading

In order to make a meaningful comparison, share prices have been rebased<sup>10</sup>. In this way, it is possible to easily evaluate the effect of different IPO underpricing and the subsequent share price performance. As we have seen previously, the company with the highest underpricing was Allegro.eu SA, that is the company that ultimately had also the highest share price increase. On the other hand, JDE Peet's NV and Conduit Holdings, two companies with a relatively low IPO underpricing, had a moderate performance. An interesting exception can be found in the case of Nordnet AB, which was fourth in terms of IPO underpricing but ended up second in terms of share price performance. This can be explained by the fact that being a "tech" company, investors might have pushed its share price up as the interest in these types of companies increased in the last year. The precise explanation to these particular share price performances is outside the scope of this thesis, however the fact that the companies which had the highest 3-month share price

<sup>&</sup>lt;sup>10</sup> Value in Base  $100 = \frac{X_t}{X_0} \times 100$ 

increase (and the highest IPO underprice) are tech companies is a first starting point in the analysis of the stock market performance in 2020.

#### 4.1.3 Conclusions

Overall, it can be said that the European IPO market in 2020 was significantly impacted by COVID-19 pandemic. However, the year ended with a positive upward trend both in terms of numbers of IPOs performed and in terms of proceeds raised. In the next year, the negative trend started in 2018 is expected to be inverted, as concerns related to Brexit uncertainties, COVID lockdowns, and US elections are fading away.

With regards to the top 5 European IPOs, a first conclusion based on the empirical data provided above can be presented on the difference of the so-called "institutional investors return" and "retail investors return" in IPOs. As we have seen in the theoretical chapters, the bulk of the shares are given to institutional investors, as they are able to either offer more money or to buy more shares compared to retail investors like us. In general, in IPOs, institutional investors represents more or less 90% of the total shares offered. Retail investors, on the other hand, are not able to access the IPO at the offer price, thus if they want to invest in the company they have to do it through the secondary market, i.e., once the shares start trading in a regulated stock exchange. If in the primary market the IPO offer price is set, as we have seen previously, through the bookbuilding process, in the secondary markets the price is purely driven by the law of demand and supply. Since investors, especially retail ones, might behave irrationally, they can push newly issued shares prices beyond the intrinsic value of the company. This, eventually, suggests that IPO underpricing can be heavily influenced by retail investors behavior. As we will see in later chapters, this is an important finding that might explain, at least in part, why 2020 saw an increase in IPO underpricing, especially for tech companies.

To conclude, in heavily underpriced IPOs, there exists a huge difference between the returns an institutional investor might achieve by participating in the IPO at the offer price and the return a retail investor might achieve by participating in the IPO at the market price. As we have seen in
this chapter, the latter was even lower than the return of the benchmark index for 3 of the top 5 European IPOs in 2020.

## 4.2 US IPO Market Overview

United States IPO market experienced a record-breaking year in 2020, both in terms of number of IPOs and in terms of proceeds raised. This result was driven also by the resurgence of SPAC activity.



Figure 12 - United States IPOs from 2010 to 2020 (Hunter & Picard, 2020)

As Figure 12Figure 12 above shows, the positive trend started in 2017 reached the peak in 2020, a record year with a total of 442 IPOs performed for a value of \$160.4 billion, the highest level of investor proceeds raised in the past 40 years.

Compared to the previous year, Figure 13 below highlights the IPO performance in quarters.



Figure 13 - United States IPOs quarterly performance of 2019 and 2020 (Hunter & Picard, 2020).

With respect to the previous year, 2020 saw more than double IPOs that raised almost triple the proceeds of 2019, despite COVID-19 outbreak and US presidential elections. In fact, in terms of quarters, the first two of 2020 lagged behind the first two of 2019. However, the second half of 2020 saw a sharp increase both in terms of volume of IPOs and values, ending a record year for equity markets with a positive upward trend.

In terms of market indices, Figure 14 below highlights the performance of the S&P 500 Index, Nasdaq 100 Index, and Dow Jones Index in 2020. In order to make a meaningful comparison, values have been rebased<sup>11</sup>.

<sup>&</sup>lt;sup>11</sup> Value in Base  $100 = \frac{X_t}{X_0} \times 100$ 



Figure 14 – US Stock Indices Performance in 2020 (Base 100).

The year started with a bull market, where S&P 500 reached its all-time highs just before COVID-19 outbreak. The bear market that followed was labelled as the fastest-ever, reaching the bottom in just 33 days before its third-fastest break-even recovery in about five months (Forbes Advisor, 2021). Eventually, the S&P 500 beat forecasts and historical average performance, ending the year at new all-time highs on the back of COVID vaccines and presidential elections results.

It is also very interesting to analyze the performance of the NASDAQ 100, the index of the main tech companies. During 2020, these types of companies experienced an outstanding performance, propelling the index to a new all-time high before other indices. As it can be seen also from the graph above, NASDAQ 100 outshined other indices, eventually ending the year with an annual return of 45.3%, even a better result than the 38% annual return of the previous year.

In the next sub-chapters, the performance of 2020 United States listings will be analyzed, focusing mainly on the underpricing phenomenon and the following short-run share price performance.

### 4.2.1 Main Listings of 2020

	Snowflake	Airbnb Inc	DoorDash Inc	Lufax Holding Ltd	Royalty Pharma
Stock Exchange	NYSE	NASDAQ	NYSE	NYSE	NASDAQ
IPO Date	15/09/2020	9/12/2020	8/12/2020	30/10/2020	15/06/2020
Proceeds Raised (\$bn)	3.36	3.51	3.37	2.36	2.19
Offer Price	\$120.00	\$68.00	\$102.00	\$13.50	\$28.00
First-Day Closing Price	\$253.93	\$144.71	\$189.51	\$12.85	\$44.50
IPO Underpricing	111.6%	112.8%	85.8%	-4.8%	58.9%

United States main listings are summarized in Table 9 below.

Table 9 - Top 5 US IPOs in terms of proceeds raised.

First of all, it is interesting to observe that the IPOs that raised the highest amount of money were those that went public in the fourth quarter of 2020. Secondly, even more intriguing is the fact that these are companies that experienced very high levels of IPO underpricing, eventually leaving on the table a huge amount of money. In fact, as mentioned in the IPO underpricing chapter, Airbnb, Snowflake, and DoorDash are respectively second, third, and fourth in the ranking of the IPOs that left the highest amount of money on the table.

### 4.2.2 Performance of Main Listings

By analyzing the share price performance of the above IPOs, it is possible to evaluate different insights. In Table 10 below is presented the 3-month share price performance calculated using

arithmetic returns, benchmarked with market indices depending on the stock exchange of the IPO.

	Snowflake	Airbnb Inc	DoorDash Inc	Lufax Holding Ltd	Royalty Pharma
IPO Underpricing	111.6%	112.8%	85.8%	-4.8%	58.9%
3-Month Performance (Offer Price)	173.8%	170.3%	38.7%	10.7%	42.2%
3-Month Market Performance	29.4%	27.0%	-25.3%	16.3%	-10.5%
Market Index 3-Month Performance	10.8%	2.8%	7.0%	18.02%	13.4%

Table 10 – 2020 Top 5 United States IPOs 3-month share price performance.

As it can be seen, for what concerns the 3-month market performance calculated on the IPO offer price, both Snowflake and Airbnb almost tripled their share price, but they started with an IPO underprice of 111% and 112% respectively. DoorDash and Royalty Pharma, on the other hand, started with a relatively low underpricing and their 3-month share price was near 40%. The case of Lufax Holding is interesting since the company was actually overpriced, i.e., the closing price of the first day of trading was lower than the IPO offer price. Compared to market indices, all companies overperformed their respective benchmark with the exception of Lufax, probably due to the initial overprice.

Instead, if we consider the 3-month market performance calculated starting from the closing market price of the first day of trading, the situation is a bit different. Snowflake and Airbnb

performed well: they experienced a return close to 30% and overperformed market indices. DoorDash and Royalty Pharma had a negative 3-month market share price performance, thus they lagged behind market indices. Lastly, as mentioned before, since Lufax had a negative IPO underpricing, the market share price was higher than the return calculated on the offer price. However, the company was not able to overperform the benchmark index.

Company	Performance Measure	Share Price	Market Index
	Mean	0.55%	0.17%
Snowflake	Volatility (St. Dev.)	5.28%	1.12%
	Mean	0.52%	0.06%
Airbnb Inc	Volatility (St. Dev.)	4.93%	1.45%
	Mean	-0.34%	0.12%
DoorDash Inc	Volatility (St. Dev.)	5.49%	0.92%
	Mean	0.45%	0.28%
Lufax Holding Ltd	Volatility (St. Dev.)	6.18%	0.96%
	Mean	-0.14%	0.22%
Royalty Pharma	Volatility (St. Dev.)	2.93%	1.61%

Table 11 – 2020 Top 5 United States IPOs 3-month daily returns mean and volatility.

It is possible to assess aftermarket performance also by looking at the daily returns in the same time frame displayed in Table 11 The daily share price return of Snowflake and Airbnb was well above the daily return of their respective market index. On the other hand, the daily return of DoorDash and Royalty Pharma was negative on average and below the daily return of the benchmark index. Contrarily to European IPOs, in this case, the high IPO underpricing resulted in an outstanding performance share price performance only in the case of Snowflake and Airbnb. In the other two cases, the companies had negative aftermarket share price performance. Figure 15 below shows the share price behavior of the first three months following the IPO. Again, share prices have been rebased in order to make a meaningful comparison<sup>12</sup>.



Figure 15 – 2020 Top 5 United States IPOs: rebased share price performance of the first 3 months of trading. Also in this case, as happened for Allegro.eu SA in European market, the companies with the highest IPO underpricing had the highest share price increase, with the exception of DoorDash,

which ultimately had a negative 3-month market share price performance. The surprise comes from Lufax Holdings, that even though it started with a negative first day of trading return, ultimately had a genuine positive 3-month share price increase of 16.3%.

This graph highlights also another interesting behavior. By looking at the returns of Airbnb and DoorDash, two companies that performed an IPO respectively on the 9<sup>th</sup> and 8<sup>th</sup> of December, it is possible to observe a similar share price pattern. In fact, both companies had a sharp share price increase in the first day of trading and subsequent 4 days of negative returns. Both share prices had a similar behavior reaching their all-time high exactly in day 43. However, in the following

<sup>&</sup>lt;sup>12</sup> Value in Base  $100 = \frac{X_t}{X_0} \times 100$ 

17 days, Airbnb share price decreased by 16% versus a decrease of 8% of the NASDAQ 100 and DoorDash share price decreased by 38% versus an increase of 1% of the S&P 500.

#### 4.2.3 Conclusions

To conclude this chapter, it can be said that, differently from Europe, 2020 was an exceptional year for the stock market in the United States, in which IPOs volumes more than doubled and proceeds raised almost tripled compared to the previous year.

Despite COVID-19 outbreak and US presidential elections uncertainties, indices reached new alltime highs carried by technology and health care companies. In addition, Federal Reserve measures and government stimulus packages fueled stock markets. The last chapter of this section, Paragraph 4.4, will summarize the findings of the previous analysis and all the differences between the performance of the European and the US market in 2020, ultimately giving an explanation of the huge IPO underpricing phenomenon.

However, before proceeding, in the following chapter the dotcom bubble will be briefly analyzed with the purpose to find analogies with what happened in 2020 in the IPO market.

## 4.3 Dotcom Bubble

During the famous dotcom bubble, IPO underpricing substantially increased, reaching an average of 65% in 1990-2000, as showed previously in Table 2. Since IPO underpricing soared to abnormal levels in 2020, it is interesting to study what happened in the last years of the nineties.

The "dotcom bubble", also called "tech bubble", is a stock market bubble that burst in March 2000 caused by the excessive speculation in hotly traded tech companies (Investopedia, 2021). As showed in Figure 16 below, Nasdaq composite rose by approximately 500% from 1995 to its peak in March 2000.



Figure 16 – Nasdaq Composite Performance from 1995 to 2021.

In 1999, the index soared, passing the 3,000 and 4,000 thresholds in a matter of months. Eventually, it reached its peak in March 2000, topping the 5,000 level. Once the bubble burst, the fall was remarkable: the index lost nearly 80% by October 2002, losing all the gains accumulated during the previous years. It took 15 years to climbing back to the 5,000 threshold.

To give more context on the phenomenon, the IPO market soared to unprecedent levels, as displayed in Table 12 below. Between 1995 and 2000, the number of IPOs increased and underpricing levels grew, reaching the peak of 71.2% on average in 1999. During the peak, IPOs left more than 7 times the average amount of money left on the table in precedent years.

This incredible stock market performance was mainly driven by retail investors mania of new tech companies. Hundreds of unprofitable companies were rushing to go public, hoping to attract as many investors as possible and eventually increase their valuations (CNN, 2021). Since retail investors believed that these new tech companies would have generated stunning profits in the future as technology progress was growing, doubts on the business model and standard valuation metrics such as price-to-earnings ratio were completely ruled out in favor of pure speculation and beliefs.

Year	Number of IPOs	First-Day Return	Money Left on the Table (bn)
1995	462	21.4%	\$4.90
1996	677	17.2%	\$6.76
1997	474	14.0%	\$4.56
1998	281	21.9%	\$5.25
1999	476	71.2%	\$37.11
2000	380	56.3%	\$29.68
2001	80	14.0%	\$2.97
2002	66	9.1%	\$1.13
2003	63	11.7%	\$1.00

Table 12 - IPOs during the Dotcom bubble.

But, to what extent the situation we are experiencing today can be compared to what happened in the past? Certainly, tech stocks are growing at very high levels despite all the uncertainties and IPO activity (as well as IPO underpricing) is undoubtedly comparable to the one in the late 90s. Are we risking another "tech bubble"?

Even if IPO market is hitting 1999 levels and retail investors (as we will see in the next chapter) are flooding in the markets, there are quite some differences between now and then.

First of all, as displayed in Figure 17 below, in the last five years tech companies grew at a rate much lower that companies the one experienced in the late nineties. Again, indices values have been rebased<sup>13</sup> in order to make the comparison possible.

<sup>&</sup>lt;sup>13</sup> Value in Base  $100 = \frac{X_t}{X_0} \times 100$ 



Figure 17 – Nasdaq growth comparison 1995-2000 versus last 5 years (29/04/2016 - 30/04/2021).

Nasdaq composite grew by 192.4% in the last five years, which is nothing compared to the stunning 525.1% increase in the dotcom year. This can be explained by the fact that while in the dotcom era tech giants grew between 11x-40x, in the last five years the biggest tech companies grew roughly by 2.5x to 6x in terms of market cap<sup>14</sup>. In the nineties, investor's addiction to tech companies pumped share prices up. Nowadays, since technology role in everyone's life is much more understood by investors, stock prices incorporate fewer irrational expectations.

Moving to the IPO market, as in the dotcom bubble, many tech companies share price experience a sharp increase in stock prices in the first day of trading following the IPO, doubling, or even tripling their market share in a matter of days. While some companies, especially tech, might be overvalued, the market in general shows that stock valuations are more in line with investors' expectations compared to those seen in the late nineties. For example, by looking at the cyclically adjusted Price over Earnings (P/E) ratio, displayed in Figure 18 below, it is possible to observe that the current P/E is below the levels reached in the dotcom bubble.

<sup>&</sup>lt;sup>14</sup> https://ofdollarsanddata.com/no-this-isnt-a-repeat-of-the-dot-com-bubble/



Figure 18 - Cyclically Adjusted Price to Earnings Ratio (Shiller, 2021).

As it can be seen, the P/E of 36.6 we are seeing in these days is still lower than the highest peak reached in 1999, where the P/E was 44.3. This might suggest that stocks are indeed overvalued, but still not at the levels of the dotcom bubble.

Another interesting measure to look at is the so called Earnings to Price (E/P) ratio, the inverse of the P/E ratio. This ratio measures the percentage of a company's earnings per share. For example, an E/P ratio of 4% means that investors are willing to pay one dollar for every 4 cents of the company earnings. As it can be seen, the lower the ratio, the more the company is overvalued. In order to assess if stocks are in general overvalued, one could simply compare the E/P ratio with the 10-year Treasury yields. As the latter are deemed to be risk-free, the return of those should be smaller than the E/P ratio. This is explained by the fact that equity shares are riskier, thus they should be priced at a rate higher than the risk-free rate (Investopedia, 2021). Figure 19 below shows this comparison.



Figure 19 – Earnings Yield and 10-Year US Treasury Rates Comparison

As it can be seen, during the dotcom bubble in late nineties, stocks were yielding much less than risk-free assets, such as 10-year United States treasury bonds. Eventually, investors realized that they could receive higher yields with lower risk and the bubble burst. Nowadays, the situation is different: in April stocks were yielding 2.31% and bonds 1.61%.

The valuations we are seeing today, thus, might be justified simply by the fact that investors have no investment alternative at all.



Figure 20 – Earnings Yield Minus 10-Year Treasury Rates.

Figure 20 above plots the difference between earnings yields and 10-Year US treasury rates. When the difference is positive, stocks are more attractive than bonds. When the difference is negative, bonds are more attractive than stocks. Contrarily to what happened in the dotcom bubble, nowadays investors put money in the stock market simply because they do not have a better alternative. As a consequence, the valuations we are seeing today and the IPO underpricing that the stock market is experiencing is fundamentally different than the pure speculation mania in tech companies happened in the dotcom bubble.

## 4.4 Why Underpricing Peaked in 2020?

In this first conclusive part of the thesis, the main findings of previous chapters will be summarized and compared with the ultimate aim to try to explain eventually why 2020 saw sharp share prices increase in the first day of trading of main IPOs performed in the US market.

The chapter is divided into three sub-chapters, each relating to a potential contributing factor to the abnormal IPO underpricing increase.

### 4.4.1 Monetary Policies Deployed

Compared to previous years, 2020 was a particularly strange year for financial markets and the world as a whole. Brexit uncertainties, United States presidential elections and, last but not least, COVID-19 outbreak, heavily impacted everyone's life and companies, threatening financial stability and resilience. As a consequence, central banks employed different measures in order to preserve economies.

In the United States, the Fed cut the Federal Funds Rate in mid-March 2020, effectively reducing short-term rates that banks charge for overnight loans. In addition, quantitative easing (QE) measures were also employed with the purpose to reduce long-term market interest rates. This combination of measures foster economic activity and send a positive powerful message to the stock market.

Factors Affecting Reserve Balances of Depository Institutions (\$/mln)	31/12/2020	1/1/2020	Change
Reserve Bank Credit	7,350,410	3,229,014	4,121,396
Securities Held Outright	6,757,661	3,017,726	3,739,935
U.S. Treasury Securities	4,688,906	2,359,995	2,328,911
Bills	326,044	156,519	169,525
Notes and Bonds, nominal	4,007,193	1,999,635	2,007,558
Notes and bonds, inflation-indexed	312,024	185,648	126,376
Inflation compensation	43,644	18,192	25,452
Federal agency debt securities	2,347	-	2,347
Mortgage-backed securities	2,066,409	657,732	1,408,677

Table 13 - Fed's Portfolio of Securities Held on the 31<sup>st</sup> of December 2020 (Federal Reserve Statistical Release, 2021). In Table 13 above is highlighted a snapshot of the Fed's balance sheet on the 31<sup>st</sup> of December 2020. As it can be seen, QE measures are represented by the \$3.7 trillion increase in the securities held outright.

As interest rates lower, investors are more likely to change their asset allocation, favoring stocks over bonds, eventually causing stock markets to ramp up.

However, not all that glitters is gold. The literature is divided in assessing whether quantitative easing measures are healthy for financial markets. Advocates contrary to this kind of central bank intervention states that the main risk is represented by asset bubbles. Quantitative easing is undoubtedly effective in stabilizing and rebounding equity markets. However, lower interest rates may encourage speculation activity that can generate euphoria among investors, thus generating momentum as long as the Fed continues to watch the back of market participants.

In addition to the above-mentioned measures, in the United States the congress approved in late March and throughout the whole year different fiscal stimulus packages in the form of checks to households and support to businesses. Amongst the different measures employed, the \$2.3 trillion CARES act signed on the 27<sup>th</sup> of March provides for a direct payment of \$1,200 per person (plus \$500 per child) to every American.

It is clear that all these stimuli, combined with the growing spread of online trading platforms accessible to almost anyone, as we will see in the next sub-chapter, fueled stock markets to new all-time highs, as investors had no investment alternatives at all.

### 4.4.2 Retail Investors Frenzy

Pandemic restrictions and fiscal stimulus propelled retail investors flooding into the stock market. The results of a survey conducted by Bloomberg Intelligence are sensational: on average, nearly 23 of all equity trading in the United States in 2020 were performed by ordinary retail investors, more than twice 2019 levels. In addition, Credit Suisse estimates stated that at times during the year they have accounted for a third of US stock market trading (Financial Times, 2021).



Figure 21 – Market Share of overall US equity trading volumes (%) (Financial Times, 2021).

In Figure 21 above, is represented in percentage the number of retail investors participating in equity markets. The important question to ask here is whether these new amateur investors are here to stay or they are only temporarily inspired by COVID-19 restrictions and consequences.

Clearly, retail investors are able to move markets, as happened very recently with the notorious Game Stop case. Since as we have seen previously in IPOs one can distinguish two "returns", IPO underpricing increase can be explained in part by retail investors behavior. The latter are able to buy shares only when those start trading and not at the offer price. Thus, in pricing IPOs, this retail interest might not be taken into account (voluntarily or not), causing share price to sharply increase in the first day of trading.

Why then retail investors flooded into the markets?

The answer can be summarized in one single word, technology. Technological progress has led to the creation of online trading platforms accessible to anyone and to the creation of social networks that ultimately amplify rumors, news, and even investment advice.

To give more context, Table 14 below shows some numbers of the famous Robinhood trading platform, widely used in the United States.

Year	Revenue	Total Transactions	Users
2016	\$9.3 million	\$0.5 billion	1 million
2017	\$21 million	\$50 billion	2 million
2018	\$69 million	\$100 billion	6 million
2019	\$111 million	\$150 billion	10 million
2020	\$673 million	\$350 billion	13 million

Table 14 – Robinhood revenues, total transactions, and users in the last 5 years (businessofapps.com, 2021).

As it can be seen, the incredible growth in terms of revenues, total transactions, and users highlight how in part retail investor interest in the stock market is gaining traction.

In addition, the possibility of spreading news and gaining attention is amplified by the use of social networks. As an example, in Figure 22 below is reported the number of subscribers in the Reddit's WallStreetBets forum.



Figure 22 - Reddit's WallStreetBets number of subscribers (subredditstats.com, 2021).

As it can be seen, the number of subscribers increased in 2020, eventually skyrocketing in January 2021. Through these forums and other online channels, retail investors coordinates investment decisions, eventually manipulating stock prices as in the famous Game Stop case.

### 4.4.3 Conclusions

As we have seen previous chapters, US stock market had an outstanding performance in 2020. Among other things, technology IPO underpricing soared, reaching the levels seen in the dotcom bubble happened in the late nineties. The answers to this particular phenomenon can be found in the consequences of the COVID-19 outbreak. First of all, in order to support the economy, central banks such as the Fed employed heavy monetary policies measures, causing stock indices to hit all-time highs. Secondly, the number of retail investors increased exponentially, carried by the widespread diffusion of online trading platforms.

The combination of these factors caused United States markets to grow to unprecedent levels, ultimately wondering whether stock markets are overvalued and therefore risking frothiness behaviors.

# 5 Airbnb Case Study

The following sub-chapters will analyze Airbnb history and business model in order to lay the foundations to perform a valuation based on the "discounted cash flow" method and the "multiple" method. The purpose of this final chapter is to assess to what extent the share price at the end of the first day of trading following the IPO and in the subsequent days can be justified by the company's fundamentals.

# 5.1 Airbnb history

Airbnb is an online platform that connects people that look for short-term rents and the so-called hosts. The latter are people that have extra space to rent. During the years, as the platform grew and hosts increased, announces were not limited to just private rooms, they included entire apartments, castles, villas, as well as boats, tree houses, private islands, and any other type of accommodation. Recently, the company expanded its business including tourism-related activities (called "Experiences").

In Figure 23 below are displayed the key events of Airbnb's history.



Figure 23 – Airbnb History

In October 2007, the two founders Brian Chesky and Joe Gebbia came up with the initial concept of offering short-term rents, breakfast, and networking opportunities as an alternative to saturated hotels. In 2008, with the addition of Nathan Biecharczyk which brought technical expertise to the team, they created Airbed & Breakfast. During the following years, the company expanded exponentially its business, reaching the milestone of 10 million bookings by June 2012 and achieving a \$30bn valuation by 2016, following different funding rounds. On the 16<sup>th</sup> of November 2020, the company filed the prospectus, announcing its intention to go public.

Throughout its history, Airbnb faced different challenges, but the most important ones are the legal environment and the acquisitions performed.

The company has faced legal challenges as cities believed that Airbnb violated local zoning laws, allowing people to evade taxes. Airbnb is undoubtedly a disruptive company that, like the Uber case, operates at the boundaries of existing laws. As such, as different cities impose different rules, legal factors should be taken into consideration in the following valuation.

Secondly, Airbnb invested a lot of money in building a strong platform. However, a small part of the money invested has been spent on internal improvements, the majority of the investments are inorganic. Throughout the years, the company acquired more than 25 companies, usually small companies with technologies that might prove useful to the platform.

## 5.2 Overview of the company

As a middleman, Airbnb creates a platform where hosts have rooms and apartments listed on the website and guests can find the units they want to rent. Originally, Airbnb charged both sides: it charged the hosts 3% of the rental fee and charged guests between 6-12% depending on the length of the stay and the total amount spent. In addition to this model, Airbnb recently introduced a new model for professional hosts, people that use Airbnb platform to run a business. In this case, Airbnb does not charge any fee to guests, it charges 14% rental fee only to professional hosts. Ultimately, guests end up paying the same amount between the two models but the way Airbnb collects the fees varies.

Airbnb business model is summarized in Figure 24 below.



Figure 24 - Airbnb Business Model.

Along the years, Airbnb has accumulated very impressive numbers. More than 4 million people offer their private rooms, entire apartments, and villas in more than 220 countries all around the world. Hosts have accommodated more than 825 million guests, cumulatively earning over \$110 billion.

In terms of main performance measures in Figure 25 below is represented the number of nights and seat for experiences booked from 2015 to 2020. Since the valuation will be performed on the IPO date, 2020 data for the last quarter has been calculated using the same percentage of the last quarter of 2019 to the total year.

The high growth of the company in the last years is evident. From 2015 to 2020, nights and experiences booked grew at CAGR equal to 35.2%. However, by comparing 2020 and 2019, it is possible to assess COVID-19 impact on the business. In fact, the number of nights and experiences booked diminished by approximately 41.5% on a year-on-year basis.



Figure 25 – Number of nights booked and seat booked for experiences net of cancellations (in \$/millions).

In Figure 26 below are highlighted the Gross Booking Value<sup>15</sup> and the revenues of the business. Again, gross booking value and revenues of 2020 have been calculated assuming the same percentage of the last quarter of 2019.

As it can be seen, gross booking value increased from 2015 to 2020 with a CAGR of approximately 36.3%. Airbnb's revenues, i.e., the fees the company collects from the rents, increased proportionally, maintaining throughout the years a percentage of 12.4% of the total gross booking value.

<sup>&</sup>lt;sup>15</sup> Dollar value of bookings on the platform inclusive of host earnings, service fees, and cleaning fees.



Figure 26 - Gross Booking Value and Revenues of Airbnb from 2015 to 2020 (in millions).

By looking at the full financial statements (available in the Airbnb Financial Statements section of the Appendix 9.2), it is possible to develop more considerations on the business. Direct operating expenses, for instance, were fairly stable at about 41% of revenues in the last years. Indirect operating expenses, on the other hand, increased, suggesting that the company is not taking advantage of possible economies of scale, at least for now.

To summarize key financial data, despite, COVID-19 impact in 2020, one can consider Airbnb as a growing company. However, the growth rate is declining due to the fact that the company's market share is increasing. Secondly, revenues have been stable and the effects of the new business model introduced for Professional Hosts only recently will take place in the coming years. In addition, if the "experiences" business takes off, it will contribute to higher revenues as the percentage fee is close to 20% of the total price. All these considerations will be used to value the company in the following chapter.

# 5.3 Valuation

In the first following sub-chapter a valuation based on the *Discounted Cash Flow* method will be performed in order to assess the sensitivity of the share price to growth rates, eventually evaluating which factors affect the share price increase. In the second sub-chapter a valuation based on the *Multiples* method will be performed, eventually highlighting at which multiples Airbnb went public.

## 5.3.1 Discounted Cash Flow

In terms of assumptions of the DCF method, Table 15 below summarizes the main inputs used.

Assumptions	
Risk-Free Rate	0.92%
Market Risk Premium	5.12%
Beta Levered	1.60
D/E Target	8.65%
Cost of Equity	9.11%
Cost of Debt	3.67%
WACC	8.56%

Table 15 - Assumptions of the Discounted Cash Flow.

The risk-free rate corresponds to the 10-Year U.S. Government Bond yield observed in December 2020. Market risk premium, Debt over Equity target, and Beta Unlevered have been observed from United States industry's averages (Software companies – internet) depicted in Damodaran tables<sup>16</sup>. Beta has been re-levered using Hamada's formula<sup>17</sup>. The weighted average cost of capital has been calculated accordingly.

<sup>&</sup>lt;sup>16</sup> http://pages.stern.nyu.edu/~adamodar/New\_Home\_Page/datafile/dbtfund.htm

http://pages.stern.nyu.edu/~adamodar/New\_Home\_Page/datafile/wacc.html

<sup>&</sup>lt;sup>17</sup> Beta Levered = Beta Unlevered ×  $(1 + (1 - t) \times \frac{D}{E})$ 

in thousands		2021	2022		2023		2024	2	2025	9	026		2027		2028	7	.029	203	0
Gross Booking Value	<b>6</b> 9	1,780,292	\$ 42,338,405		54,997,582	\$ 69	,797,423	\$ 86,	701,651	\$ 105,	600,087	\$ 12	6,316,056	\$ 14	8,617,966	\$ 172,	,233,476	196,86	4,705
growth rate		36.9%	33.2 %	~	29.9%		26.9%		24.2%		21.8%		19.6%		17.7%		15.9%		14.3%
Revenues	÷	3,813,635	\$ 5,174,694	<b>4</b>	6,844,143	∞ ⊕	,841,007	\$ 11,	174,880	\$ 13,	845,345	<del>, 1</del>	6,842,141	4 4	0,145,991	\$ 23,	,729,946	27,56	1,059
Revenues as % of GBV		12.0%	12.2 %	~	12.4%		12.7%		12.9%		13.1%		13.3%		13.6%		13.8%		14.0%
EBIT	\$	(371,934)	\$ (320,685	2) \$	(180,797)	÷	80,801	÷	499,460	\$ 1,	111,094	\$	1,950,420	÷	3,049,328	\$ 4	,435,532	5,51	2,212
Operating Margin		-9.8%	-6.2%	<u>`</u> 0	-2.6%		0.9%		4.5%		8.0%		11.6%		15.1%		18.7%		20.0%
EBIT $\times$ (1 – t)	\$	(278,950)	\$ (240,514	<b>(1</b>	(135,598)	÷	60,600	\$	374,595	÷	833,321	<b>69</b> -	1,462,815	÷	2,286,996	ຕັ ອ	,326,649	4,13	4,159
Capex	\$	(135,189)	\$ (165,095	3) \$	(196,519)	\$	(228,471)	\$	259,905)	) \$	289,813)	\$	(317,288)	\$	(341,576)	\$	(362,108) \$	(37	8,512)
FCF	\$	(414,139)	\$ (405,607	\$ (2	(332,117)	÷	(167,870)	÷	114,690	se.	543,508	\$	1,145,527	÷	1,945,420	\$ \$	,964,541	3,75	5,647

Figure 27 – Discounted Cash Flow valuation

In Figure 27 above is displayed the calculation of the discounted cash flows. The Gross Booking Value is the starting point of the analysis. It is assumed to start from a 37% growth (the CAGR of the last 5 years) and then it is assumed to decay at a 10% rate each year for the entire explicit period.

Revenues, on the other hand, are calculated as a percentage of the Gross Booking Value. As highlighted previously, Airbnb standard business model entails a 12% commission on the Gross Booking Value. Revenues are thus calculated accordingly, taking into consideration also the new "professional host" business model and the potential increase of the "experiences" business. As a consequence, the commission is assumed to grow from 12% to 14% in the next 10 years.

EBIT is calculated taking into consideration previous years margins and industry margins. As a consequence, operating margin starts from a negative 10% in the first year of the explicit period and it grows linearly to 20% in the following years. Margins will be higher than the ones of hotel business (averaging 10% according to Damodaran) and in line with those of comparable competitors, such as Booking and Expedia. However, the latter companies generate revenues also through a merchant business, i.e., by buying blocks of hotel rooms and reselling them at higher prices.

Lastly, Capital Expenditures have been calculated as a decreasing percentage of revenues. They started at the average of the last 5 years of 3.54% and they decrease at a 10% rate each year.

The results of the discounted cash flows are summarized in Table 16 below. As it can be seen, the Equity Value amounts at \$38.1 billion, implying a target share price of \$59. After having created a basic model describing the potential share price of Airbnb, it is extremely interesting to perform a sensitivity analysis in order to evaluate the assumptions given the values the shares are traded in the first days of trading.

Economic Measure	Value (i	n thousands)
Terminal Value	\$	64,281,128
PV of Terminal Value	\$	28,273,862
PV of FCF	\$	4,022,565
EV	\$	32,296,427
+ Cash	\$	4,495,211
- Indebtedness	\$	(1,997,500)
+ Proceeds	\$	3,400,000
EQ	\$	38,194,138
Shares Outstanding		597,448
Newly Issued Shares		50,000
Share Price	\$	58.99

Table 16 – Discounted Cash Flow Valuation Output.

Clearly, the two main key drivers of Airbnb's value are the Gross Booking Value and the operating margin. Higher margins are translated into higher value and higher gross booking value is translated into higher revenues and eventually higher value. As a consequence, Figure 28 below proposes different thresholds of the above-mentioned measures with the respective share price.

As it can be easily seen, the target share price of \$59 is expected at an operating margin of 20% and a total gross booking value of almost \$200 billion, representing 13% of the Serviceable Available Market (SAM) of \$1.5 trillion highlighted in Airbnb's prospectus. As deeply explained in the next chapter, Airbnb priced its IPO at \$68 per share and eventually recorded a share price of \$144.71 at the end of the first day of trading. Through the development of the discounted cash flow model, it is possible to see that this share price is justified by future excepted margins of at

least 30% and a gross booking value of more than \$375 billion (25% of the serviceable available market).

				C	)peı	rating Marg	gin					
		15%		20%		25%		30%		35%		40%
\$150,000,000	\$	40.28	\$	48.60	\$	56.91	\$	65.23	\$	73.55	\$	81.87
\$175,000,000	\$	44.44	\$	54.14	\$	63.85	\$	73.55	\$	83.26	\$	92.96
\$196,864,705	\$	48.07	\$	58.99	\$	69.91	\$	80.83	\$	91.74	\$	102.66
\$ 225,000,000	\$	52.76	\$	65.23	\$	77.71	\$	90.19	\$	102.67	\$	115.14
\$ 250,000,000	\$	56.91	\$	70.78	\$	84.64	\$	98.51	\$	112.37	\$	126.24
\$ 275,000,000	\$	61.07	\$	76.32	\$	91.57	\$	106.83	\$	122.08	\$	137.33
\$ 300,000,000	\$	65.23	\$	81.87	\$	98.51	\$	115.14	\$	131.78	\$	148.42
\$ 325,000,000	\$	69.39	\$	87.42	\$	105.44	\$	123.46	\$	141.49	\$	159.51
\$ 350,000,000	\$	73.55	\$	92.96	\$	112.37	\$	131.78	\$	151.19	\$	170.60
\$ 375,000,000	\$	77.71	\$	98.51	\$	119.30	\$	140.10	\$	160.90	\$	181.69
\$ 400,000,000	\$	81.87	\$	104.05	\$	126.24	\$	148.42	\$	170.60	\$	192.78
	\$ 150,000,000 \$ 175,000,000 \$ 196,864,705 \$ 225,000,000 \$ 250,000,000 \$ 300,000,000 \$ 325,000,000 \$ 350,000,000 \$ 375,000,000 \$ 400,000,000	\$ 150,000,000 \$   \$ 175,000,000 \$   \$ 196,864,705 \$   \$ 225,000,000 \$   \$ 250,000,000 \$   \$ 275,000,000 \$   \$ 300,000,000 \$   \$ 325,000,000 \$   \$ 325,000,000 \$   \$ 375,000,000 \$   \$ 400,000,000 \$	150,000,000 \$ 40.28   175,000,000 \$ 44.44   196,864,705 \$ 48.07   225,000,000 \$ 52.76   225,000,000 \$ 56.91   275,000,000 \$ 61.07   300,000,000 \$ 65.23   325,000,000 \$ 73.55   375,000,000 \$ 77.71   400,000,000 \$ 81.87	150,000,000 \$ 40.28 \$   150,000,000 \$ 44.24 \$   175,000,000 \$ 48.07 \$   196,864,705 \$ 48.07 \$   225,000,000 \$ 52.76 \$   225,000,000 \$ 56.91 \$   275,000,000 \$ 61.07 \$   300,000,000 \$ 65.23 \$   325,000,000 \$ 69.39 \$   \$ 350,000,000 \$ 73.55 \$   \$ 375,000,000 \$ 77.71 \$   \$ 400,000,000 \$ 81.87 \$	15% 20%   \$ 150,000,000 \$ 40.28 \$ 48.60   \$ 175,000,000 \$ 44.44 \$ 54.14   \$ 196,864,705 \$ 48.07 \$ 58.99   \$ 225,000,000 \$ 52.76 \$ 65.23   \$ 250,000,000 \$ 56.91 \$ 70.78   \$ 275,000,000 \$ 61.07 \$ 76.32   \$ 300,000,000 \$ 65.23 \$ 81.87   \$ 325,000,000 \$ 73.55 \$ 92.96   \$ 375,000,000 \$ 77.71 \$ 98.51   \$ 400,000,000 \$ 81.87 \$ 104.05	Open     15%   20%     \$ 150,000,000   \$ 40.28   \$ 48.60   \$     \$ 175,000,000   \$ 44.44   \$ 54.14   \$     \$ 196,864,705   \$ 48.07   \$ 58.99   \$     \$ 225,000,000   \$ 52.76   \$ 65.23   \$     \$ 225,000,000   \$ 56.91   \$ 70.78   \$     \$ 275,000,000   \$ 65.23   \$ 81.87   \$     \$ 300,000,000   \$ 65.23   \$ 81.87   \$     \$ 325,000,000   \$ 73.55   \$ 92.96   \$     \$ 375,000,000   \$ 77.71   \$ 98.51   \$     \$ 400,000,000   \$ 81.87   \$ 104.05   \$	Operating Marg     15%   20%   25%     \$ 150,000,000   \$   40.28   \$   48.60   \$   56.91     \$ 175,000,000   \$   44.44   \$   54.14   \$   63.85     \$ 196,864,705   \$   48.07   \$   58.99   \$   69.91     \$ 225,000,000   \$   52.76   \$   65.23   \$   77.71     \$ 225,000,000   \$   56.91   \$   70.78   \$   84.64     \$ 275,000,000   \$   61.07   \$   76.32   \$   91.57     \$ 300,000,000   \$   65.23   \$   81.87   \$   98.51     \$ 325,000,000   \$   69.39   \$   87.42   \$   105.44     \$ 350,000,000   \$   73.55   \$   92.96   \$   112.37     \$ 375,000,000   \$   77.71   \$   98.51   \$   126.24	Operating Margin   15% 20% 25%   \$ 150,000,000 \$ 40.28 \$ 48.60 \$ 56.91 \$   \$ 175,000,000 \$ 44.44 \$ 54.14 \$ 63.85 \$   \$ 175,000,000 \$ 44.44 \$ 54.14 \$ 63.85 \$   \$ 196,864,705 \$ 48.07 \$ 58.99 \$ 69.91 \$   \$ 225,000,000 \$ 52.76 \$ 65.23 \$ 77.71 \$   \$ 250,000,000 \$ 56.91 \$ 70.78 \$ 84.64 \$   \$ 275,000,000 \$ 61.07 \$ 76.32 \$ 91.57 \$   \$ 300,000,000 \$ 65.23 \$ 81.87 \$ 98.51 \$   \$ 325,000,000 \$ 67.32 \$ 98.51 \$ \$   \$ 330,000,000 \$ 67.35 \$ 92.96 \$ 112.37 \$   \$ 3350,000,000 \$ 77.71 \$ 98.51	Operating Margin     15%   20%   25%   30%     \$ 150,000,000   \$   40.28   \$   48.60   \$   56.91   \$   65.23     \$ 175,000,000   \$   44.44   \$   54.14   \$   63.85   \$   73.55     \$ 196,864,705   \$   48.07   \$   58.99   \$   69.91   \$   80.83     \$ 225,000,000   \$   52.76   \$   65.23   \$   77.71   \$   90.19     \$ 250,000,000   \$   56.91   \$   70.78   \$   84.64   \$   98.51     \$ 275,000,000   \$   61.07   \$   76.32   \$   91.57   \$   106.83     \$ 300,000,000   \$   65.23   \$   81.87   \$   98.51   \$   115.14     \$ 325,000,000   \$   67.35   \$   92.96   \$   112.37   \$   131.78     \$ 375,000,000   \$   77.71   \$   98.51	Operating Margin     15%   20%   25%   30%     \$ 150,000,000   \$   40.28   \$   48.60   \$   56.91   \$   65.23   \$     \$ 175,000,000   \$   44.44   \$   54.14   \$   63.85   \$   73.55   \$     \$ 196,864,705   \$   48.07   \$   58.99   \$   69.91   \$   80.83   \$     \$ 225,000,000   \$   52.76   \$   65.23   \$   77.71   \$   90.19   \$     \$ 225,000,000   \$   56.91   \$   70.78   \$   84.64   \$   98.51   \$     \$ 275,000,000   \$   61.07   \$   76.32   \$   91.57   \$   106.83   \$     \$ 300,000,000   \$   65.23   \$   81.87   \$   98.51   \$   123.46   \$     \$ 350,000,000   \$   73.55   \$   92.96   \$   112.37   \$   131.78	Operating Margin15%20%25%30%35%\$ 150,000,000\$40.28\$48.60\$56.91\$65.23\$73.55\$ 175,000,000\$44.44\$54.14\$63.85\$73.55\$83.26\$ 196,864,705\$48.07\$58.99\$69.91\$80.83\$91.74\$ 225,000,000\$52.76\$65.23\$77.71\$90.19\$102.67\$ 250,000,000\$56.91\$70.78\$84.64\$98.51\$112.37\$ 275,000,000\$61.07\$76.32\$91.57\$106.83\$122.08\$ 300,000,000\$65.23\$81.87\$98.51\$115.14\$131.78\$ 325,000,000\$69.39\$87.42\$105.44\$123.46\$141.49\$ 350,000,000\$73.55\$92.96\$112.37\$131.78\$151.19\$ 375,000,000\$77.71\$98.51\$119.30\$140.10\$160.90\$ 400,000,000\$81.87\$104.05\$126.24\$148.42\$170.60	Operating Margin     15%   20%   25%   30%   35%     \$ 150,000,000   \$   40.28   \$   48.60   \$   56.91   \$   65.23   \$   73.55   \$     \$ 175,000,000   \$   44.44   \$   54.14   \$   63.85   \$   73.55   \$   83.26   \$     \$ 196,864,705   \$   48.07   \$   58.99   \$   69.91   \$   80.83   \$   91.74   \$     \$ 225,000,000   \$   52.76   \$   65.23   \$   77.71   \$   90.19   \$   102.67   \$     \$ 225,000,000   \$   56.91   \$   70.78   \$   84.64   \$   98.51   \$   112.37   \$     \$ 275,000,000   \$   61.07   \$   76.32   \$   91.57   \$   106.83   \$   122.08   \$     \$ 300,000,000   \$   65.23   \$   81.87   \$   98.51 <td< th=""></td<>

Figure 28 - Sensitivity Analysis on Airbnb Share Price

# 5.3.2 Multiple Method

In order to value a company with the multiple method, a panel of comparable companies should be identified. Airbnb operates in between the hotel industry and the online short-term rentals. Thus, two panels<sup>18</sup> will be identified showcasing how the company multiples perform compared to peers in the two different groups.

For what concerns hotel companies, Figure 29 below summarizes industry multiples.

<sup>&</sup>lt;sup>18</sup> Data as of 10<sup>th</sup> December 2020 (date of Airbnb IPO)

Company	Mkt Cap	EV	Revenues	EBIT	Net Income	PE	EV/Sales	EV/EBIT
Marriott	41,620	52,150	20,972	1,938	1,273	32.69	2.49	26.91
Hilton	28,960	37,530	9,452	1,576	881	32.87	3.97	23.81
Intercontinental	11,642	13,430	4,627	764	385	30.24	2.90	17.58
Hyatt	7,439	9,010	5,020	197	766	9.71	1.79	45.74
Choice Hotels	5,682	6,600	1,114	334	222	25.59	5.92	19.76
Wyndham	5,402	7,500	2,053	442	157	34.41	3.65	16.97

Figure 29 – Comparable Hotel Companies (figures in \$/mln).

As it can be seen, in the hotel industry panel of comparable companies, the average P/E ratio is 27.6. Enterprise value average multiples, such as EV/Sales and EV/EBIT are, respectively, 3.5 and 25.1. The situation is different considering online booking companies, such as Booking.com and Expedia. Figure 30Figure 30 below shows the second panel of comparable companies.

Company	Mkt Cap	EV	GBV	Revenues	EBIT	Net Income	PE	EV/Sales	EV/GBV	EV/EBIT
Booking.com	84,067	85,530	96,400	15,066	5,345	4,865	17.28	5.68	0.89	16.00
Expedia	17,503	22,480	107,870	12,067	961	565	30.98	1.86	0.21	23.39

Figure 30 – Comparable Online Booking Companies (figure in \$/mln).

In this case, average P/E ratio is 24.1, EV/Sales is 3.8 and EV/EBIT is 19.7. In addition, for these companies, also EV/Gross Booking Value multiple was calculated, which averaged 0.55.

in thousand	2019	LTM
Gross Booking Value	\$ 37,962,600	\$ 27,490,650
Revenues	\$ 4,805,239	\$ 3,720,245
EBIT	\$ (501,543)	\$ (615,353)
Net Income	\$ (674,339)	\$ (865,450)
Net Financial Position	\$ 2,654,877	\$ 2,497,711

Table 17 – Airbnb financial data used in the multiple method.

Table 17 above summarizes Airbnb key financial measures. Last twelve month (LTM) data has been calculated by summing 2019 last quarter results to the results of the first three quarters of 2020. As it can be seen, Airbnb has a negative operating margin and a negative net income, for this reason, only enterprise value multiples will be considered in the valuation.

Since 2020 was heavily impacted by COVID-19 and thus data will yield a valuation too pessimistic, 2019 data will be used to better reflect Airbnb potentiality. Figure 31 below shows the multiples valuation football field.



Figure 31 – Equity Value Football Field.

As it can be seen, given Airbnb fundamentals (specifically revenues and gross booking value), comparable companies multiples yield equity values that are too low compared to the ultimate

IPO offer price of Airbnb. However, as explained in the next chapter, the company was priced at \$68 per share, implying an equity value of approximately \$47 billion, thus suggesting an overvaluation compared to peers. Considering the fact that the market capitalization reached more than \$100 billion at the end of the first day of trading, it is clear that Airbnb share price is not driven by its fundamentals, rather by investors' positive expectations for the future and, as seen previously, by booming equity markets following expansionary monetary policies.

# 5.4 From Start-Up to IPO

After rumors of going public starting from 2016, on Monday, November 16<sup>th</sup> Airbnb filed its preliminary prospectus, announcing his intention to perform the long awaited initial public offering. At a first glance, the timing does not seem appropriate: COVID-19 cases were increasing and many countries were facing severe restrictions and lockdowns, preventing in most cases travel between countries and cities.

Why then a company, as we have seen previously, that relies on short-term rentals decide to go public amid this crisis?

First of all, equity markets were booming, carried by investors' positive expectations and expansionary monetary policies. As a consequence, other IPOs occurred previously in the year in the United States such as Snowflake, Li Auto, X Peng, Unity Software, and many others as reported in Table 18 below, experienced strong first-day returns.

Company Name	Date	Exchange	Offer Price	Share Price 1DT	% Change
Warner Music Group (WMG)	3/6/2020	NASDAQ	\$ 25.00	\$ 30.12	20.5%
Li Auto (LI)	30/7/2020	NASDAQ	\$ 11.50	\$ 16.46	43.1%

Rocket Companies (RKT)	6/8/2020	NYSE	\$ 18.00	\$ 21.51	19.5%
X Peng (XPEV)	27/8/2020	NYSE	\$ 15.00	\$ 21.22	41.5%
Snowflake (SNOW)	16/9/2020	NYSE	\$ 120.00	\$ 253.93	111.6%
Unity Software (U)	18/9/2020	NYSE	\$ 52.00	\$ 68.35	31.4%
GoodRx Holdings (GDRX)	23/9/2020	NASDAQ	\$ 33.00	\$ 50.50	53.0%
Palantir (PLTR)	30/9/2020	NYSE	\$ 10.00	\$ 9.50	-5.0%
DoorDash (DASH)	9/12/2020	NYSE	\$ 102.00	\$ 189.51	85.8%
Airbnb (ABNB)	10/12/2020	NASDAQ	\$ 68.00	\$ 144.71	112.81%

Table 18 – Main IPOs of 2020 in the United States.

DoorDash, a company that went public one day earlier compared to Airbnb, almost doubled its market capitalization on the first day of trading, suggesting that investors were ready to deploy fresh dry powder into hot issues in equity markets.

To confirm this, it is possible to look also at Airbnb valuation throughout its history, displayed in Table 19 below.

Туре	Date	Amount Raised	Valuation
Seed	Jan 2009	\$ 20 k	\$ 2.5 m
Series A	Nov 2010	\$ 7.2 m	\$ 70 m
Series B	Jul 2011	\$ 114.9 m	\$ 1.3 bn
Series C	Oct 2013	\$ 200 m	\$ 2.9 bn
Series D	Apr 2014	\$ 519.7 m	\$ 10.5 bn
Series E	Jun 2015	\$ 1.6 bn	\$ 25.5 bn

Sep 2016	\$ 1 bn	\$ 31 bn
Apr 2020	\$ 1 bn	\$ 18 bn
Dec 2020	\$ 3.5 bn	\$ 47 bn
Dec 2020	n.a.	\$ 86.5 bn
	Sep 2016 Apr 2020 Dec 2020 Dec 2020	Sep 2016   \$ 1 bn     Apr 2020   \$ 1 bn     Dec 2020   \$ 3.5 bn     Dec 2020   n.a.

Table 19 – Airbnb Valuation History (Craft.co, 2020).

As it can be seen, post IPO market capitalization is well above the company's strong growth throughout the years. In its last funding round before the IPO, Airbnb raised \$ 1 billion from two private equity funds (Silver Lake and Sixth Street Partners) through a mix of equity and debt, reaching a valuation close to \$ 18 billion (CNBC, 2020).

In the week before the IPO, Airbnb revised its price range two times. On Tuesday, 1<sup>st</sup> of December, the company set a price range at \$44 and \$50 per share. On Monday, 7<sup>th</sup> of December, revised its price range, expecting to list shares between \$56 and \$60 per share. Eventually, Airbnb priced its offer at \$68 per share, far above the revised target range, ultimately reaching a valuation of \$47 billion. At the end of the first day of the first day of trading the company reached a valuation of \$86.5 billion, more than double its IPO valuation and more than Marriot and Hilton (two of the biggest hotel chains in the world) market capitalization combined.

# 5.5 Aftermarket performance

The purpose of this final sub chapter is to evaluate how Airbnb performed compared to market indexes in the months following its quotation. At the moment of writing, on the 29<sup>th</sup> of May 2021, Airbnb market share price return is -6.9%, compared to 8.6% of the Nasdaq Composite and 13.3% of the S&P.



Figure 32 – Airbnb Aftermarket share price performance.

Figure 32 above highlights Airbnb share price performance compared to Nasdaq Composite and S&P 500. As it can be easily seen, the company had a positive return from December to the first days of May. Nowadays, Airbnb is trading at a share price lower than the ones reached at the end of the first day of trading, suggesting that the company was overvalued.

To assess its market performance, it is also interesting to see how it trades compared to peers. By looking at the Price/Sales (P/S) ratio<sup>19</sup>, a ratio that describes how much someone has to pay to acquire one share of a company for each dollar of revenue it generates, it is possible to assess whether the company is over or under valued. Table 20 below shows P/S ratio of Airbnb and its main peers as of the 28<sup>th</sup> of May 2021.

 $<sup>^{19}</sup>$  P/E ratio can also be used, however, Airbnb has never been profitable, thus this ratio is not applicable in this case

Company	Market Cap (\$/bn)	LTM Revenues (\$/bn)	P/S Ratio
Airbnb	86.7	3.4	25.4
Marriott	46.8	8.2	5.7
Hilton	34.9	3.3	10.7
Booking.com	97.0	5.7	17.2
Expedia	26.0	4.2	6.1

Table 20 – Airbnb and comparable companies Price to Sales Ratio (Stock Analysis, 2021).

It is evident that Airbnb shares trade at a much higher price-to-sales ratio compared to peer companies, both hotels and booking platforms such as Booking and Expedia. Given its fundamentals, it is clear that Airbnb stock is either overvalued compared to its peers or the expectations on its future returns are extremely positive. However, if the latter is true, why then Airbnb does not have a significant institutional ownership compared to, for example, Booking?



Figure 33 – Airbnb and Booking Ownership Structure.
As displayed in Figure 33 above, it is clear that once the lockup period of 6 months, individual insiders might start selling their shares due to the overvaluation and to monetize. In addition, Airbnb, contrarily to Booking, has 32% of shares in the hands of the general public. This fact confirm what said in the previous chapters, that Airbnb share price has been driven mainly by retail investors. Institutional investors, i.e., investors more sophisticated, realize that the company is overvalued and prefer to wait to see what happens.

### 6 Conclusions

The main purpose of this thesis was to analyze the IPO market in 2020 and ultimately explain why equity markets boomed and IPO issuers eventually left huge amounts of money on the table. To support the research and conclusions, in the last chapter, Airbnb IPO was analyzed more in depth due to its particularly high IPO underpricing and media attention on the listing in a year marked by a global pandemic.

In the first two chapters, a brief literature review on the IPO underpricing phenomenon was conducted in order to evaluate what was, on average, the amount of money left on the table in an IPO. In 2020, in the United States IPO underpricing substantially increased to 41.6%, more than double compared to the average of 18.4% between 1980 and 2020. There exist many behavioral and economic theories trying to explain why issuers decide to sell their shares at a discount (the most cited in the existing literature are reported in Chapter 3 - IPO Underpricing), however, the main reasons for IPO underpricing might be summarized as following.

First of all, it is favorable for underwriters to underprice shares because by doing so demand will naturally increase (as the price will be lower). As a consequence, marketing costs will be reduced, potential buyers will overpay in commissions to receive the shares, and lastly, underwriters will reduce the risk of having shares unallocated, thus reducing market risk on banking book.

Secondly, it is proven that issuers are not upset about underpricing their shares in an IPO because prospect theory states that the loss represented by the money left on the table is more than offset by the gain coming from the share price increase in the first trading day.

In Chapter 4 - IPO Activity in 2020, the performance of the European and the American IPO market was analyzed. Differently from Europe, 2020 was an exceptional year for equity markets in the United States in which stock indexes reached new all-time highs and IPOs volumes and proceeds raised more than doubled despite COVID-19 outbreak and presidential elections uncertainties. The reasons for this record-breaking performance can be attributed to two main

factors: monetary policies deployed and retail investors frenzy. With regards to the first factor, COVID-19 crisis was tackled by quantitative easing measures and fiscal stimulus packages, effectively causing investors to favor stocks over bond and thus, causing equity markets to ramp up. On the other hand, with regards to the second factor, 2020 saw an exponential increase in retail investors trading activity, backed by the surge of easily accessible online trading platforms.

In addition to the above, in Chapter 4.3 - Dotcom Bubble, a parallelism with the dotcom bubble was conducted, given the similarities in terms of IPO underpricing, with the purpose to assess whether the high valuations and booming markets we are witnessing nowadays might resemble an asset bubble. The main difference can be summarized through the analysis of the Earnings to Price (E/P) ratio, the inverse of the P/E ratio. While in the nineties this ratio was lower than the 10Y treasury rate, thus implying that equity assets were considered less risky than bonds, nowadays the situation is different: low interest rates give investors no investment alternative to equities. As a consequence, the overvaluation we are seeing today is not purely driven by investors irrational mania to tech companies (also considering that today technology is well understood by the public compared to the late nineties) rather by the economic conditions we are facing.

In the last part of the thesis, Chapter 5 - Airbnb Case Study, a case study based on Airbnb longawaited IPO was conducted with the purpose to evaluate whether the current valuation is justified by company's fundamentals or not. Both "discounted cash flow" and "multiples" valuation methods yielded equity values substantially below current share prices, suggesting a strong overvaluation of the company compared to peers. The IPO offer price was \$68 per share, implying an equity value of \$47 billion. At the end of the first day of trading, Airbnb capitalization reached more than \$100 billion, ultimately suggesting that the price increase was not driven by strong fundamentals rather by too optimistic positive expectations and irrational behavior. In fact, the current ownership structure of Airbnb presented in the last chapter highlights that the share price in the first day of trading and in the following months has been driven mainly by retail investors speculation activity and thus it is detached from the company's fundamentals.

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# 9 Appendix

# 9.1 1980-2020 US IPOs and Money Left on The Table

Period	Number of IPOs	Mean First-Day Return	Aggregate Amount of Money Left on The Table (in billions)	Aggregate Proceeds (in billions)		
1980	71	14.3%	\$0.18	\$0.91		
1981	192	5.9%	\$0.13	\$2.31		
1982	77	11.0%	\$0.13	\$1.00		
1983	451	9.9%	\$0.84	\$8.89		
1984	171	3.7%	\$0.05	\$2.02		
1985	186	6.4%	\$0.23	\$4.09		
1986	393	6.1%	\$0.68	\$13.40		
1987	285	5.6%	\$0.66	\$11.68		
1988	105	5.5%	\$0.13	\$3.88		
1989	116	8.0%	\$0.27	\$5.81		
1990	110	10.8%	\$0.34	\$4.27		
1991	286	11.9%	\$1.50	\$15.39		
1992	412	10.3%	\$1.82	\$22.69		
1993	510	12.7%	\$3.52	\$31.44		
1994	402	9.6%	\$1.43	\$17.18		
1995	462	21.4%	\$4.90	\$27.95		
1996	677	17.2%	\$6.76	\$42.05		
1997	474	14.0%	\$4.56	\$31.76		
1998	281	21.9%	\$5.25	\$33.65		
1999	476	71.2%	\$37.11	\$64.67		
2000	380	56.3%	\$29.68	\$64.80		
2001	80	14.0%	\$2.97	\$35.29		
2002	66	9.1%	\$1.13	\$22.03		
2003	63	11.7%	\$1.00	\$9.54		
2004	173	12.3%	\$3.86	\$31.19		

2005	159	10.3%	\$2.64	\$28.23
2006	157	12.1%	\$3.95	\$30.48
2007	159	14.0%	\$4.95	\$35.66
2008	21	5.7%	\$5.63	\$22.76
2009	41	9.8%	\$1.46	\$13.17
2010	91	9.4%	\$1.84	\$29.82
2011	81	13.9%	\$3.51	\$26.97
2012	93	17.7%	\$2.75	\$31.11
2013	158	20.9%	\$7.89	\$41.56
2014	206	15.5%	\$5.40	\$42.20
2015	118	19.2%	\$4.16	\$22.00
2016	75	14.5%	\$1.77	\$12.52
2017	106	12.9%	\$3.68	\$22.98
2018	134	18.6%	\$6.39	\$33.47
2019	112	23.5%	\$6.93	\$39.18
2020	165	41.6%	\$29.66	\$61.86

# 9.2 Airbnb Financial Statements

#### Income Statement:

	Year Ended 31st December										9 Months	
in thousands 2015		2015	2016		2017		2018		2019		2020	
Gross Booking Value		8,057,700	\$	13,924,800	\$	20,975,300	\$	29,440,700	\$	37,962,600		
Revenues	\$	919,041	\$	1,655,576	\$	2,561,721	\$	3,651,985	\$	4,805,239	\$	2,518,935
Costs:												
Cost of Revenues	\$	226,397	\$	412,748	\$	647,690	\$	864,032	\$	1,196,313	\$	666,295
Operations and Support	\$	181,285	\$	270,292	\$	395,739	\$	609,202	\$	815,074	\$	548,369
Product Development	\$	99,685	\$	228,061	\$	400,749	\$	579,193	\$	976,695	\$	690,677
Sales and Marketing	\$	397,238	\$	663,057	\$	871,749	\$	1,101,327	\$	1,621,519	\$	545,510
G&A Expenses	\$	138,133	\$	214,411	\$	327,156	\$	479,487	\$	697,181	\$	421,082
Restructuring Charges	\$	-	\$	-	\$	-	\$	-	\$	-	\$	136,969
Total Costs and Expenses		(1,042,738)	\$	(1,788,569)	\$	(2,643,083)	\$	(3,633,241)	\$	(5,306,782)	\$	(3,008,902)
Operating Profit	\$	(123,697)	\$	(132,993)	\$	(81,362)	\$	18,744	\$	(501,543)	\$	(489,967)

#### Balance Sheet:

	As of 31st December										As of 30th September	
	2015		2016		2017		2018		2019		2020	
in thousands												
Cash, Cash Equivalents, and Marketable Securities	\$	2,024,988	\$	2,842,470	\$	2,887,808	\$	3,329,308	\$	3,074,273	\$	4,495,211
Restricted Cash Funds receivables and	\$	-	\$	-	\$	-	\$	-	\$	115	\$	55,628
amounts held on behalf of customers	\$	881,385	\$	1,492,492	\$	2,323,405	\$	2,305,011	\$	3,145,457	\$	2,354,450
Working Capital (Current Assets - Current Liabilities)	\$	1,770,474	\$	2,379,989	\$	2,121,733	\$	2,138,522	\$	1,327,679	\$	2,828,152
Total Assets	\$	3,108,279	\$	4,706,075	\$	6,050,830	\$	6,613,089	\$	8,310,119	\$	8,728,479
Funds payable and amounts payable to customers	\$	1,248,555	\$	2,144,942	\$	3,386,403	\$	3,898,895	\$	5,886,302	\$	6,873,261
Total Liabilities	\$	2,283,308	\$	3,181,637	\$	3,231,502	\$	3,231,502	\$	3,231,502	\$	3,231,502
Redeemable convertible preferred stock	\$	2,283,308	\$	3,181,637	\$	3,231,502	\$	3,231,502	\$	3,231,502	\$	3,231,502
Additional Paid-In Capital	\$	113,895	\$	64,492	\$	184,943	\$	259,466	\$	617,690	\$	744,413
Accumulated Deficit	\$	(535,595)	\$	(682,945)	\$	(753,888)	\$	(768,888)	\$	(1,420,991)	\$	(2,117,856)
Total Stockholder's Deficit	\$	(423,584)	\$	(620,504)	\$	(567,075)	\$	(517,308)	\$	(807,685)	\$	(1,376,284)

# **The LUISS**

Department of Business and Management Chair in Equity Markets and Alternative Investments

# "The long-awaited Airbnb-IPO: money left on the table in tech listings in a year marked by a global pandemic"

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Academic Year 2020/2021

## Summary

#### **Chapter 1 - Introduction**

During 2020, a particular year for financial markets due to COVID-19, in the United States 165 companies were listed on the NYSE and the NASDAQ, raising in total \$61.9 billion. At the end of their first day of trading, the shares traded on average at 41.6% above the price at which the company sold them during the IPO, leaving an aggregate amount of "money left on the table" of approximately \$29.7 billion. Considering the fact that from 2009 to 2019 the average first-day return was 16.0% and the amount of money left on the table was on average \$4.2 billion each year for an average of \$28.6 proceeds raised, it is evident that 2020 was a particularly dazzling year for equity markets. However, these abnormal price surges on the first days of trading stirred tormented memories of the well-known dotcom bubble, warning investors of potential frothiness in a too hot market.

Airbnb, the famous short-term rental online platform, went public on the 10<sup>th</sup> of December 2020, with an IPO offer price of \$68. At the end of its first day of trading, its shares traded at \$144, implying a 113% share price increase. As it can be seen from the figure below, only three other companies faced such a sharp share price increase on the first day of trading – and that happened in the peak of the dotcom bubble. During 2020, other "tech companies" IPOs experienced strong share price appreciations, as in the case of Snowflake in September and DoorDash just one day before Airbnb IPO, highlighting signs of valuations untethered from corporate earnings.



Share Price Increase in the First Day of Trading

Thus, the purpose of this thesis is to study and eventually explain the reasons why, in 2020, United States equity markets overperformed initial expectations, with indexes reaching new alltime highs amid a global pandemic and IPO underpricing soaring to the levels previously seen only in the late nineties, ultimately questioning whether the stock overvaluation we are witnessing today can result in a bubble.

#### Chapter 2 – IPO Process

This chapter is divided into two parts, in the first part it is explained how the IPO process works while in the second part it is explained how underwriters eventually come up with a valuation range for the IPO-ing company.

With regards to the first part, through the IPO process, the company is able to receive cash if primary shares are sold or existing shareholders are able to monetize their initial investment if secondary shares are sold. Therefore, the reasons why companies decide to list their shares should be now more evident. For example, if a company wants to expand its business through the implementation of new projects, it might raise the necessary proceeds through an IPO, accessing to public equity capital and eventually lowering cost of funding. Another reason might be the will of existing shareholders to sell their shares and monetize part or the entirety of their initial investment. An example might be provided by private equity funds that wish to cash in their investments through the sale of existing shares via an IPO process. In addition, going public might provide indirect benefits such as the additional visibility and publicity that might attract talented employees and management.

With regards to the second part, it can be said that the process of valuing the issuing company is one of the most critical phases in an IPO. The theoretical value of a firm is the parameter by which the different counterparties base their expectations. In the chapter, valuation methods used in order to value a company are briefly described, focusing specifically on the valuation of companies that want to go public. From a theoretical point of view, there are three broad categories of methods employed in order to value a company. It is possible to use financial methods, market methods, and asset-based methods. Financial methods and asset-based methods are based on the intrinsic characteristics of the company under valuation. On the other hand, market methods, as the name suggests, are based on external characteristics, such as comparable companies. When dealing with firms conducting IPOs, most of the times the issuing companies will be relatively young, thus forecast future cash flows will be a very hard task. As a consequence, market methods based on comparable companies are preferred over financial methods such as discounted cash flows or adjusted present value methods. However, a comprehensive valuation, wherever possible, will provide a better view on the final valuation range. A study conducted shows that 87.3% of underwriters use comparable firm/transaction multiples. The most common multiples used are price-earnings ratios, price-to-cash flow ratios,

price-to-sales ratios, and enterprise value ratios. Tied for second (in both cases 59.2% of underwriters use them) are discounted cash flows and dividend discounted models.

#### Chapter 3 – IPO Underpricing

This chapter highlights the main theories explaining the "IPO underpricing" phenomenon. Empirical evidence tells us that when a company goes public, the issue price tends to be actually underpriced, resulting in a substantial share price increase on the first day of trading.

As it is pointed out in the existing literature, it is favorable for underwriters to leave money on the table because potential investors will compete for final allocation. As a consequence, since many IPOs are oversubscribed, underwriters will be able to choose to which potential investor allocate the shares. At first, it might seem that by underpricing shares, underwriters will receive less fees since proceeds will be lower. However, three benefits might be identified in an underpriced IPO: first of all, low IPO offer price will reduce underwriter's marketing costs, as it will be easier to find potential buyers; secondly, potential buyers might overpay in commissions to be sure to receive the shares; thirdly, underwriters minimize the risk of having shares unallocated when the price is more attractive (therefore avoiding keeping shares on their books and be subject to market risk). The consequence is that there is a conflict of interest, as underwriter's incentives (to receive the most money possible in fees) are misaligned with those of issuers (i.e., to raise the most amount of money possible). Based on the data on money left on table by Jay Ritter, if potential investors are willing to overpay (soft dollars) on commissions 30 cents for every \$1 of money left on the table, a \$1 increase in the offer price will provide underwriters 7 cents in revenue fees but a loss of 30 cents in soft dollar revenue. That explains also why empirical evidence shows that in bookbuilding IPOs, underprice is higher. In fact, in auctions or direct listings, underwriters do not have the possibility to allocate shares to the most profitable clients, i.e., those who will pay more in commissions in order to get the shares.

Issuers, on the other hand, are not upset about leaving money on the table because of prospect theory. In this specific context, prospect theory assumes that issuers are interested in the change of their wealth rather than the level of wealth. In most IPOs, issuers will sum the wealth loss deriving from the money left on the table and they will compare it with the wealth gain deriving from the share price increase deriving from initial underpricing.

#### Chapter 4 – IPO Activity in 2020

The purpose of this chapter is to analyze IPO activity in 2020 and compare it to previous years in order to assess the potential COVID impact in the stock market and eventually explain why tech

listings are experiencing a sharp share price increase in the first days of trading. In addition, in the last part of the chapter a parallelism with the dotcom bubble was conducted in order to

Globally 2020 saw the highest amount of proceeds (€331 billion) raised in the last ten years, mainly driven by the increase of SPAC activity, for a total amount of 1415 IPOs. United States accounted for 53% of the total proceeds raised from IPOs, followed by China (17%), Hong Kong (10%), Brazil (3%), and United Kingdom (2%). Thus, the following analysis will review the performance of different markets and stock exchanges, eventually focusing on the US market.

#### Europe

From 2010 to 2020, Europe has seen a swinging performance of IPOs in terms of volume and value. The peak was reached in 2015 after an upward trend that started in 2012, with 364 IPOs performed for a value of  $\notin$ 57.4 billion. The following years saw different up and downs. In terms of COVID impact in Europe, compared to 2019, 2020 saw more IPOs in terms of volume but with a lower value. Despite the lower proceeds raised in total compared to the previous year, 2020 saw an upward trend both in volume and value throughout the whole year, reaching the peak of 71 IPOs for  $\notin$ 8.6 billion euros in the last quarter, a 42% increase of proceeds raised compared to the same period in the previous year.

In terms of the market in general, in Q1 stock indices experienced a sharp decrease due to COVID-19. As a consequence, IPO activity slowed, with 31 IPOs performed in the first half of 2020 compared to the 53 performed in the first half of 2019. However, in the following months of 2020, STOXX 600 and DAX showed a strong recovery, ending up the year slightly below pre-pandemic levels. On the other hand, FTSE 100 lagged behind the other indices, ending the year substantially below pre-pandemic levels due to the constituent companies of the index and continuing Brexit trading negotiations.

To conclude, it can be said that the European IPO market in 2020 was significantly impacted by COVID-19 pandemic. However, the year ended with a positive upward trend both in terms of numbers of IPOs performed and in terms of proceeds raised. In the next year, the negative trend started in 2018 is expected to be inverted, as concerns related to Brexit uncertainties, COVID lockdowns, and US elections are fading away.

#### **United States**

United States IPO market experienced a record-breaking year in 2020, both in terms of number of IPOs and in terms of proceeds raised. This result was driven also by the resurgence of SPAC activity. The positive trend started in 2017 reached the peak in 2020, a record year with a total of 442 IPOs performed for a value of \$160.4 billion, the highest level of investor proceeds raised in

the past 40 years. With respect to the previous year, 2020 saw more than double IPOs that raised almost triple the proceeds of 2019, despite COVID-19 outbreak and US presidential elections. In fact, in terms of quarters, the first two of 2020 lagged behind the first two of 2019. However, the second half of 2020 saw a sharp increase both in terms of volume of IPOs and values, ending a record year for equity markets with a positive upward trend.

In terms of market indices, the year started with a bull market, where S&P 500 reached its all-time highs just before COVID-19 outbreak. The bear market that followed was labelled as the fastestever, reaching the bottom in just 33 days before its third-fastest break-even recovery in about five months. Eventually, the S&P 500 beat forecasts and historical average performance, ending the year at new all-time highs on the back of COVID vaccines and presidential elections results. For what concerns the NASDAQ 100, the index of the main tech companies. During 2020, these types of companies experienced an outstanding performance, propelling the index to a new all-time high before other indices. NASDAQ 100 outshined other indices, eventually ending the year with an annual return of 45.3%, even a better result than the 38% annual return of the previous year.

To conclude, differently from Europe, 2020 was an exceptional year for the stock market in the United States, in which IPOs volumes more than doubled and proceeds raised almost tripled compared to the previous year. Despite COVID-19 outbreak and US presidential elections uncertainties, indices reached new all-time highs carried by technology and health care companies. In addition, Federal Reserve measures and government stimulus packages fueled stock markets.

#### **Dotcom Bubble**

During the famous dotcom bubble, IPO underpricing substantially increased, reaching an average of 65% in 1990-2000. Since IPO underpricing soared to abnormal levels also in 2020, a comparison with the dotcom bubble was conducted. Thus, to what extent the situation we are experiencing today can be compared to what happened in the past? Certainly, tech stocks are growing at very high levels despite all the uncertainties and IPO activity (as well as IPO underpricing) is undoubtedly comparable to the one in the late 90s. Are we risking another "tech bubble"?

First of all, in the last five years tech companies grew at a rate much lower that companies the one experienced in the late nineties. Nasdaq composite grew by 192.4% in the last five years, which is nothing compared to the stunning 525.1% increase in the dotcom year. This can be explained by the fact that while in the dotcom era tech giants grew between 11x-40x, in the last five years the biggest tech companies grew roughly by 2.5x to 6x in terms of market cap. In the nineties, investor's addiction to tech companies pumped share prices up. Nowadays, since technology role in everyone's life is much more understood by investors, stock prices incorporate fewer irrational expectations. Moving to the IPO market, as in the dotcom bubble, many tech companies share

price experience a sharp increase in stock prices in the first day of trading following the IPO, doubling, or even tripling their market share in a matter of days. While some companies, especially tech, might be overvalued, the market in general shows that stock valuations are more in line with investors' expectations compared to those seen in the late nineties. For example, by looking at the cyclically adjusted Price over Earnings (P/E) ratio it is possible to observe that the current P/E is below the levels reached in the dotcom bubble. The P/E of 36.6 we are seeing in these days is still lower than the highest peak reached in 1999, where the P/E was 44.3. This might suggest that stocks are indeed overvalued, but still not at the levels of the dotcom bubble. Another interesting measure to look at is the so-called Earnings to Price (E/P) ratio, the inverse of the P/E ratio. During the dotcom bubble in late nineties, stocks were yielding much less than risk-free assets, such as 10-year United States treasury bonds. Eventually, investors realized that they could receive higher yields with lower risk and the bubble burst. Nowadays, the situation is different: in April stocks were yielding 2.31% and bonds 1.61%. The valuations we are seeing today, thus, might be justified simply by the fact that investors have no investment alternative at all. Contrarily to what happened in the dotcom bubble, nowadays investors put money in the stock market simply because they do not have a better alternative. As a consequence, the valuations we are seeing today and the IPO underpricing that the stock market is experiencing is fundamentally different than the pure speculation mania in tech companies happened in the dotcom bubble.

#### IPO Underpricing in 2020

The purpose of this chapter is to summarize the reasons that led to abnormal levels of IPO underpricing during 2020. First of all, compared to previous years, 2020 was a particularly strange year for financial markets and the world as a whole. Brexit uncertainties, United States presidential elections and, last but not least, COVID-19 outbreak, heavily impacted everyone's life and companies, threatening financial stability and resilience. As a consequence, central banks employed different measures in order to preserve economies. In the United States, the Fed cut the Federal Funds Rate in mid-March 2020, effectively reducing short-term rates that banks charge for overnight loans. In addition, quantitative easing (QE) measures were also employed with the purpose to reduce long-term market interest rates. This combination of measures fosters economic activity and send a positive powerful message to the stock market. As interest rates lower, investors are more likely to change their asset allocation, favoring stocks over bonds, eventually causing stock markets to ramp up. However, not all that glitters is gold. The literature is divided in assessing whether quantitative easing measures are healthy for financial markets. Advocates contrary to this kind of central bank intervention states that the main risk is represented by asset bubbles. Quantitative easing is undoubtedly effective in stabilizing and rebounding equity markets. However, lower interest rates may encourage speculation activity that can generate euphoria among investors, thus generating momentum as long as the Fed

continues to watch the back of market participants. In addition to the above-mentioned measures, in the United States the congress approved in late March and throughout the whole year different fiscal stimulus packages in the form of checks to households and support to businesses. Amongst the different measures employed, the \$2.3 trillion CARES act signed on the 27<sup>th</sup> of March provides for a direct payment of \$1,200 per person (plus \$500 per child) to every American. It is clear that all these stimuli, combined with the growing spread of online trading platforms accessible to almost anyone, as we will see in the next sub-chapter, fueled stock markets to new all-time highs, as investors had no investment alternatives at all.

Secondly, pandemic restrictions and fiscal stimulus propelled retail investors flooding into the stock market. The results of a survey conducted by Bloomberg Intelligence are sensational: on average, nearly 23 of all equity trading in the United States in 2020 were performed by ordinary retail investors, more than twice 2019 levels. In addition, Credit Suisse estimates stated that at times during the year they have accounted for a third of US stock market trading. Clearly, retail investors are able to move markets, as happened very recently with the notorious Game Stop case. Since as we have seen previously in IPOs one can distinguish two "returns", IPO underpricing increase can be explained in part by retail investors behavior. The latter are able to buy shares only when those start trading and not at the offer price. Thus, in pricing IPOs, this retail interest might not be taken into account (voluntarily or not), causing share price to sharply increase in the first day of trading. Why then retail investors flooded into the markets? The answer can be summarized in one single word, technology. Technological progress has led to the creation of online trading platforms accessible to anyone and to the creation of social networks that ultimately amplify rumors, news, and even investment advice.

#### Chapter 5 – Airbnb Case Study

The purpose of this final chapter is to assess to what extent the share price at the end of the first day of trading following the IPO and in the subsequent days can be justified by the company's fundamentals.

Airbnb is an online platform that connects people that look for short-term rents and the so-called hosts. The latter are people that have extra space to rent. During the years, as the platform grew and hosts increased, announces were not limited to just private rooms, they included entire apartments, castles, villas, as well as boats, tree houses, private islands, and any other type of accommodation. Recently, the company expanded its business including tourism-related activities (called "Experiences"). In October 2007, the two founders Brian Chesky and Joe Gebbia came up with the initial concept of offering short-term rents, breakfast, and networking opportunities as an alternative to saturated hotels. In 2008, with the addition of Nathan Biecharczyk which brought technical expertise to the team, they created Airbed & Breakfast. During the following years, the company expanded exponentially its business, reaching the

milestone of 10 million bookings by June 2012 and achieving a \$30bn valuation by 2016, following different funding rounds. On the 16<sup>th</sup> of November 2020, the company filed the prospectus, announcing its intention to go public. Throughout its history, Airbnb faced different challenges, but the most important ones are the legal environment and the acquisitions performed. The company has faced legal challenges as cities believed that Airbnb violated local zoning laws, allowing people to evade taxes. Airbnb is undoubtedly a disruptive company that, like the Uber case, operates at the boundaries of existing laws. As such, as different cities impose different rules, legal factors should be taken into consideration in the following valuation. Secondly, Airbnb invested a lot of money in building a strong platform. However, a small part of the money invested has been spent on internal improvements, the majority of the investments are inorganic. Throughout the years, the company acquired more than 25 companies, usually small companies with technologies that might prove useful to the platform. As a middleman, Airbnb creates a platform where hosts have rooms and apartments listed on the website and guests can find the units they want to rent. Originally, Airbnb charged both sides: it charged the hosts 3% of the rental fee and charged guests between 6-12% depending on the length of the stay and the total amount spent. In addition to this model, Airbnb recently introduced a new model for professional hosts, people that use Airbnb platform to run a business. In this case, Airbnb does not charge any fee to guests, it charges 14% rental fee only to professional hosts. Ultimately, guests end up paying the same amount between the two models but the way Airbnb collects the fees varies.

#### Valuation

The discounted cash flow yielded a share price of \$58.99. This price is expected at an operating margin of 20% and a total gross booking value of almost \$200 billion, representing 13% of the Serviceable Available Market (SAM) of \$1.5 trillion highlighted in Airbnb's prospectus. Airbnb priced its IPO at \$68 per share and eventually recorded a share price of \$144.71 at the end of the first day of trading. Through the development of the discounted cash flow model, it is possible to see that this share price is justified by future excepted margins of at least 30% and a gross booking value of more than \$375 billion (25% of the serviceable available market).

Given Airbnb fundamentals (specifically revenues and gross booking value), comparable companies multiples yield equity values that are too low compared to the ultimate IPO offer price of Airbnb. However, since the offer price was \$68 per share, implying an equity value of approximately \$47 billion, multiple method suggests an overvaluation compared to peers. Considering the fact that the market capitalization reached more than \$100 billion at the end of the first day of trading, it is clear that Airbnb share price is not driven by its fundamentals, rather by investors' positive expectations for the future and, as seen previously, by booming equity markets following expansionary monetary policies.