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Il ruolo delle relazioni underwriter-investitore sull'underpricing

The role of underwriter-investor relationships on IPO pricing

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Introduction

An initial public offering, or IPO, refers to the first time a company offers and sells its stock to the general public. After the issuance of IPOs, in most circumstances, a company changes from privately owned to publicly owned, and thus the process of IPO issuance is often referred to as going public (Deeds, Decarolis & Coombs, 1997). In recent years, the amount of capital aggregated by IPOs has increased consistently. According to statistics from Ritter (2014), for IPOs with an initial price above \$5 per share, the capital raised in the U.S. stock market reached \$354.10 billion over the period from 2001 to 2013, which is approximately more than six times the \$53.45 billion observed from 1980 to 1989. Investors' demand for IPOs continues to exceed supply, as demonstrated by the observation IPOs are generally oversubscribed by investors before the initial date (Bertoni & Giudici, 2014). Moreover, not only IPOs have captured significant attention from investors, but the phenomena have attracted considerable interest among scholars in both finance and psychology. A substantial body of research has been conducted on IPO-related topics from both the financial perspective (e.g., R. K. Aggarwal, Bhagat & Rangan, 2009; Pagano, Panetta & Zingales, 1998; Ritter & Welch, 2002) and the psychology perspective (e.g., Rock, 1986; Benveniste & Wilhelm, 1990).

This thesis will review both the finance and psychology literatures. From finance, concepts such as the tasks of the three main parties (issuers, underwriters and investors), the going public process, underpricing phenomenon, the long-term underperformance phenomenon,

will be introduced. From psychology, the interactions among these main parties and incentives affecting these main parties will be discussed.

The thesis is organised as follows. Chapter 1 describes different players that participate in an IPO. A review of the literature presenting the main theories on underpricing and long-run underperformance is proposed in chapter 2. Chapter 3 focus on the relationships among parties involved in IPOs. Chapter 4 presents the empirical analysis conducted on US IPOs between 2000 and 2016 and results are commented and explained. Finally, conclusions offer a summary of the key empirical findings.

1. The Players in IPO process

Issuing shares for public investors is one way of raising public equity, which means a company is selling shares of control of the company to public investors in exchange for capital (M. J. Brennan & Franks, 1997).

Raising equity capital is different from raising debt capital: the former grants investors rights to vote and to receive dividends according to the company's dividend policy and profit in a given fiscal year; the latter grants the creditors fixed interest payments regardless of the company's profit in a given fiscal year (Frank & Goyal, 2003). In an IPO, because public investors buy shares conferring control over a company, after the new shares are issued, the company's ownership status changes, for instance, from privately owned to publicly owned (Deeds et al., 1997).

From an organizational standpoint, taking a company public is one of the biggest decisions a company's board of directors will make in the company's lifetime. The process of going public is a milestone for private company but it is complex, complicated and time-consuming. It involves different specific steps and requires important decisions to be made. Firms need to accurately take into consideration not only the trade-off between the advantages and disadvantages of going public, but also the implications of this decision and the problems that will arise. The decision to go public, in fact, generates substantial changes in the everyday life of a company: there is a change in the firm's ownership structure, a loss of management control, an increase in information disclosure requirements and an increase in regulatory oversight. Other important issues that need to be analysed

before starting the IPO process are: the check of substantial, formal and listing requirements, the choice of the stock market, the path leading to the listing and the relationship with investors.

The success of the operation strictly depends on the decisions taken, on the planning of the whole process and on the management of the relationships with other parties involved.

This chapter will focus on the three main parties involved in the entire IPO process, namely, issuers, underwriters and investors. These players not only act separately but also interact with one another in different phases of the process. For this reason, later in this chapter, every step of the IPO process will be described.

1.1 Issuers in IPOs

The issuer is the legal entity whose shares are offered to investors and subsequently listed on the relevant stock exchange. The sales of newly issued shares to investors by the issuer and where the issuer receives the proceeds from the sale of the shares is known as the “primary offering”.

A company is often considered a black box seeking to achieve certain operating goals, regardless of the individuals involved (Jensen & Meckling, 1979), but actually, firm behavior and the outcomes of a corporation can be regarded as a reflection of values and ideas of its chief executives (Hambrick & Mason, 1984). In other words, the “brain” of the firm is the individuals who play significant roles within the firms. These individuals can be

either chief executive officers (CEOs) and chief financial officers (CFOs), both of whom are likely to have strong impacts on IPO process.

But what should CEOs of private companies consider when thinking about eventually going public?

1.1.1 Advantages of going public

The conventional wisdom is that going public is simply a stage in the growth of a company. Although there is some truth in it, this "theory" alone cannot explain the observed pattern of listings. Even in developed capital markets like the United States, some large companies are not public. In bank centric financial system, like Germany and Italy, publicly traded companies are the exceptions rather than the rule, and quite a few private companies are much larger than the average publicly traded company. These cross-sectional and cross-country differences indicate that going public is not a stage that all companies eventually reach, but is a choice. This begs the question of why some companies choose to use public equity markets and some don't (Pagano, Panetta and Zingales, 1998). Moreover, there are several ways to raise capital other than raising public equity, such as borrowing from creditors, seeking investment from venture capitalists, typically a single, large institutional investor, or from angel investors, generally groups of small investors (Covas & Haan, 2011; Hellmann & Thiele, 2014). Of the various methods for raising public equity, IPOs have attracted the greatest amount of attention from both investors and scholars.

Thus, one might ask, given the various financing options available, why would a company favor public equity financing over other methods? The broad explanation that the reason for IPOs is to fund growth does not really answer the question of why the entrepreneurs choose an IPO to fund that growth.

In many cases, researchers studying the IPO hot market phenomenon (“IPO waves” of Ibbotson and Jaffe, 1975 and Ritter, 1984) discuss motives for going public as determinants of waves. For example, Lowry and Schwert (2002) and Pastor and Veronesi (2005) find that insiders tend to go public after observing improving market conditions.

It is important to distinguish between timing and motives of IPOs: they are somehow connected, but they are separate questions.

James C. Brau (2010) try to summarize such motives in twelve points. Firms go public in order:

1. *To minimize the cost of capital and optimize the capital structure.*

Perhaps the earliest literature to address why firms go public (at least indirectly) begins with the seminal capital structure literature of Modigliani and Miller (M&M 1958, 1963). M&M’s famous Proposition I states that “Market value of any firm is independent of its capital structure ...” (M&M, 1958). When corporate taxes are introduced, the tax shield of debt results in an optimal capital structure of 100% debt (M&M 1963). M&M lay the ground work for the theory of optimal capital structure in their 1958 and 1963 papers; but, it is the introduction of primarily bankruptcy costs that result in an optimal structure other than irrelevance or 100% debt. The work of Baxter (1967) and Stiglitz (1969) argues that

if a firm obtains too much financing from debt, the increased bankruptcy (i.e., financial distress) costs begin to hurt the value of the firm. Thus, the introduction of bankruptcy costs results in an optimal mix of debt-to-equity to minimize the weighted average cost of capital (WACC). In a discounted cash flow context, minimizing the WACC, ceteris paribus, maximizes the value of the firm. Interestingly, one of the few studies addressing this issue was conducted by Pagano et al. (1998), using the ex-ante and ex-post IPO financial data from Italy. Pagano noted that companies were more likely to conduct an IPO due to financial structure considerations and less likely to do so to raise capital by comparing the ex-ante and ex-post financial characteristics (including profitability, financial leverage, cost of credit, etc.) of companies that went public. In the same paper, he found that firm size and market-to-book ratio in the industry have a positive effect on the likelihood that a firm will conduct an IPO. The market-to-book ratio is calculated as the market price of a stock divided by book value of a stock, and it is usually interpreted as measuring future growth or the investors' confidence in a company or an industry (L. Chen & Zhao, 2006). In other words, companies conduct IPOs to rebalance the proportion of debt and equity. Their empirical results showed that, after an IPO, the cost of credit decreased (Pagano et al., 1998).

2. To overcome borrowing constraints or increase bargaining power with banks.

Pagano et al. (1998) argue that gaining access to a source of finance other than banks or venture capital “is probably the most cited benefit of going public, which is explicitly or implicitly present in most models”. Citing Basile (1988), Pagano et al. (1998) argue that access to public equity markets may increase firm's bargaining power and help to reduce

their cost of debt (Rajan, 1992). In turn, gaining access to public equity markets increase firm transparency with investors.

3. *To follow the pecking order theory of financing: equity-retained earnings-debt.*

By assuming that entrepreneurs have superior information on the firm than do outside creditors and investors, the order in which a firm raises capital should follow a pecking order: beginning with internal equity such as retained earnings, then using debt, and finally using external equity (Myers & Majluf, 1984). This is because in the presence of asymmetric information, the more information one needs to make investment decisions, the more return one requires on this investment. When the cost of obtaining required information is considered, outsiders will demand greater interest or dividends due to their inferior information. Thus, internal financing is considered less costly than external financing. Of the two approaches to external financing, issuing debt is considered to reflect more favorably on the firm than issuing equity because outsiders perceive the issuance of debt as an indicator of strong confidence in the board and that the firm's value is underestimated; hence issuing bonds is less costly than issuing stocks (Myers, 1984). Consequently, based on this theory, conducting an IPO would be the least desirable means of obtaining financing and should be used when no other option is available. This line of logic asserts that outside investors take the issuance of external equity as a negative signal and that management feel the firm is over-valued. However, the literature on IPO underpricing (e.g., Stoll and Curley, 1970; Logue, 1973) suggests IPOs are often in high demand (priced above investment bank estimates of fair value) and the IPO long-run performance literature (e.g., Ritter, 1991) suggests that equity is often overvalued at issue.

Both of these observations are contrary to the pecking order underlying logic. So, in such case, pecking order theory is not applicable.

4. ***To create a public market and use shares as a payment method for subsequent acquisitions.*** The explanations for conducting an IPO from the acquisition perspective focus on the takeover activities related to going public. Firms involved in an acquisition can be either acquirers (companies that take over other firms) or acquirees (companies that are taken over). Specifically, acquirers can be firms that have already issued IPOs and use their shares as payment to acquire other firms, i.e., conducting an IPO in preparation for acquiring other companies in the future (Celikyurt, Sevilir, & Shivdasani, 2010), or firms that use acquisition as a way of going public, i.e., going public by acquiring public companies. Acquirees in this context have already conducted IPOs with the aim of being taken over in a reverse merger. Conducting an IPO helps potential acquirers to facilitate a new type of payment in addition to the traditional payment, such as cash or fixed assets.
5. ***To establish a market price for subsequent sell-out.*** Company insiders can be interested in going public to establish a market price for their firm as a first step in cashing out. The second step would then be a sell-out i.e. selling the firm at the hopefully higher market value.
6. ***To create an analyst following, where IPO firms will experience favorable analyst following on average.*** Having an analyst following can increase the reputation of a firm and create shareholder value (e.g., with favorable analyst recommendations) (Bradley, Jordan, and Ritter, 2003).

7. ***To take the first-mover advantage and increase publicity.*** Firms can conduct IPOs in an attempt to capture a first-mover advantage and to increase the publicity or reputation of the firm. The IPO itself can serve to create buzz in the business community, increasing the reputation of the firm, and creating a first-mover advantage in the IPO's niche (Maksimovic and Pichler, 2001).
8. ***To use the window of opportunity.*** At times, the IPO market becomes highly bullish and strong investor demand may over-inflate the price of IPO shares. Different studies (e.g. Ritter, 1991, Loughran and Ritter, 1995, Pagano et al., 1998) argue that such windows of opportunity exist, and IPO insiders take advantage of them to issue over-priced shares. Ritter (1991), in his seminal paper on the long-run performance of IPOs is among the first to show that IPOs average negative, risk-adjusted long-run returns. One of the primary explanations for the poor long-run IPO returns is that insiders (with the help of investment bankers and VCs) can time the market to exploit windows of opportunity. Long-run underperformance will be addressed in detail in chapter 2.
9. ***To herd because other firms in the same industry have gone or are going public.*** Herd behavior can be taken by companies for two kind of reasons. "IPO waves" is the first. Generally, companies tend to herd when competitors are going public in order to not be left behind. Moreover, Companies that are going public draw the attention of the public. But, as we mentioned before, "IPO waves" concerns timing instead of motives. The second reason to herd is the belief of the management to reach more growth opportunities for the average firm than normal. Up to now there has been no real consensus behind the reason of herding behavior in IPOs.

10. To allow more dispersion of ownership. Chemmanur and Fulghieri (1999) argue that IPOs broaden the ownership base of the firm. In their model, the benefits of an IPO are contrasted with the lower information-production costs of being privately-held. Moreover, the increased share liquidity of being public creates value for IPO insiders according to market microstructure literature (Pagano et al., 1998).

11. To offer stock-based compensation after the IPO. Publicly traded stock allows for efficient compensation programs. This hypothesis suggests that firms will offer more stock-based compensation schemes (e.g. stock options) after the IPO.

12. To cash out, especially for venture capital backed IPOs. IPO is the main way in which professional private equity investors, such as VCs, can exit and harvesting their investments.

1.1.2 Disadvantages of going public

Companies should also consider the downside of an initial public offering. The decision to go public lead to several new obligation and costs that can be summarized in five points: IPO Expenses and Fees, Additional regulatory requirements and disclosure, Market Pressure, Potential loss of control and Underpricing.

1. *Expenses and Fees.*

Undertaking an IPO is a time-consuming and costly process. Companies must consider not only the costs associated with the IPO process (the costs of listing) but also the ongoing costs of being a public company (the costs of maintaining a public company structure). According to Dessy and Vender (2001), rather than costs, it would be more appropriate to talk about “investments” needed to go public, as the decision of becoming a public company brings several benefits that help the firm to create value in the long-term. All the key decisions made by the issuer during the IPO process affect the direct and indirect costs of going public. The most important decisions influencing the price are: the choice of the underwriter, the proportion of equity sold to new investors, the amount of money to raise, the price of the issue, the pricing and allocation mechanism. In addition, as shown by Menyah and Paudyal (2002), the costs depend also on firm characteristics and market conditions such as firm size (market capitalization), pre-IPO ownership of the company, the book to market ratio and the market volatility at the time of the IPO.

The most relevant cost of the IPO is the underwriter’s compensation. The underwriters customarily receive a discount (the “spread”) between the price at which they buy stock from the issuer or selling shareholders and the price at which the underwriters resell the same stock to the public. The gross spread is expressed as a percentage of total IPO proceeds. In US, medium-size IPOs tend to have a gross spread equal to 7% while, in Europe, this percentage is generally lower. Gross spread comprehends management fee, selling fee and underwriting fee, which are negotiated between the issuer and the underwriter and, generally, revealed in the prospectus. The split is typically 20%

management fee, 20% underwriting fee, and 60% selling fee. Like the 7% gross spread (Chen and Ritter, 2000), the 20/20/60 division is widely recognized as the industry standard (Torstila, 2001).

Marketing campaign and road show expenses, legal and accounting fees, printing expenses for the prospectus and registration (or listing) fees, Financial Industry Regulatory Authority (FINRA) fees and SEC fees are the other main costs to be incurred. According to Heim (2002), “attorneys’ fees, accounting fees and other expenses can easily add up to \$400,000 to \$500,000 for a typical IPO”. An example of IPO expenses and fees is reported in Table 1.1. It must be also considered the opportunity cost of management time: the time that senior managers spend working with investment bank’s analysts in preparing the prospectus and other documents for the IPO. “Each hour that the management and employees of a company spend in providing information to the lawyers and investment bankers is an hour that is lost in running the operations of the company” (Heim, 2002). The pricing mechanism influences also the cost of an IPO. In general, pricing the IPO using book-building process is more expensive than using fixed-price or auction mechanism. After having studied a sample of 2,143 IPOs by issuers from 65 countries during the period from 1992 to 1999, Ljungqvist, Jenkinson and Wilhelm (2003), found that “the direct costs of book-building are, in our sample, around twice as high as in fixed-price offerings”. Different price mechanism will be discussed later in this Chapter.

	<u>Amount</u>	<u>Percentage of Gross Proceeds</u>
Total gross proceeds	\$150,000,000	100.00%
Underwriters' spread	10,500,000	7.00%
	<u>\$139,500,000</u>	<u>93.00%</u>
SEC registration fee	19,320	0.01%
FINRA filing fee	23,000	0.02%
NASDAQ Global Market listing fee*	125,000	0.08%
Printing and engraving expenses	500,000	0.33%
Legal fees and expenses	1,250,000	0.83%
Accounting fees and expenses	1,250,000	0.83%
Transfer agent and registrar fees	25,000	0.02%
Miscellaneous (including road show)	250,000	0.17%
Total	<u>\$ 3,442,320</u>	<u>2.29%</u>
<u>Net proceeds to company</u>	<u>\$136,057,680</u>	<u>90.71%</u>

Table 1.1 - Example of IPO costs of a company listing in Nasdaq. The example does not include any allowance for the salaries and expenses of the company's employees, some of whom may work almost exclusively on the IPO for a period of months, nor do they include the additional expenses (principally legal and accounting fees) that the company will incur in the future in order to comply with its new responsibilities as a public company.

2. **Additional regulatory requirements and disclosures**

Unlike private companies, public companies are required to file quarterly reports within 40 days (if the company is a large accelerated filer or an accelerated filer) or within 45 days (if the company is a non-accelerated filer) of the end of each of the first three quarters of their fiscal years and annual reports within 60 days (if the company is a large accelerated filer), within 75 days (if the company is an accelerated filer) or within 90 days (if the company is a non-accelerated filer) and prompt reporting of certain specified current material events with the Securities and Exchange Commission (SEC). These financial statements must be prepared in accordance with United States Generally Accepted

Accounting Principles (US GAAP) and audited by a certified public accounting firm. These SEC regulations are both burdensome and costly. Reporting a company's financial position publicly requires the company to establish more stringent financial controls, staff a financial reporting team and audit committee, implement quarterly and yearly financial close processes, hire an audit firm, and complete hundreds of other tasks. As a general matter, public companies simply do not miss filing deadlines, and any delinquency in a required filing can be interpreted by analysts and investors as a sign that the company does not have its house in order.

3. *Market Pressures*

Market pressures can be very difficult for company leadership who are used to doing what they feel is best for the company. Founders tend to have a long-term view, with a vision of what their company will look like years from the present and how it will impact the world. The stock market, on the other hand, has a very short-term, profit-driven view. Once a company is public, its every move is scrutinized by investors and analysts around the world, who are generally interested in one question: "Will this company meet its quarterly earnings target?" If a company meets its target, its stock price will normally increase; if not, its stock price will normally decrease. Even if leadership is doing what is best for the company in the long-run, failing to meet the public's short-term goals may cause the company to lose value

4. Potential loss of control

One major disadvantage of an IPO is that founders (or other member of senior management) may lose control of their company. While there are ways to ensure founders retain the majority of the decision-making power in the company, once a company is public, the leadership needs to keep the public happy, even if other shareholders do not have voting power. Going public means receiving considerable amounts of money from public shareholders. Since shareholders have given the company so much money, they expect the company to act in their best interest, even if it means going in a direction the founders dislike. If shareholders feel the company is not operating in a way that will help them make money, they will force the company, through shareholder votes or public criticism, to appoint new leadership.

5. Underpricing

Finally, also the underpricing is generally considered an indirect cost of an IPO. It is defined as the percentage difference between the offer price and the first day closing price. It is an opportunity cost since issuers, selling shares at a price below their potential market value, are “leaving money on the table”. Underpricing phenomenon will be discussed and analysed in Chapter 2.

1.2 Underwriters in IPOs

Underwriters, which can be investment banks or commercial banks, help issuers to sell their debt or equity issues to the public, and their function is similar to that of wholesalers in commodity selling (Evan & Levin, 1966).

Although U.S. commercial banks were prevented from engaging in underwriting activities by the 1933 Glass-Steagall Act, due to their frequent lending relationships with issuers, commercial banks have gradually become active in underwriting since 1989 (Drucker & Puri, 2005; Yasuda, 2005). Investment banks, by contrast, have always been active in the underwriting business, and they are occasionally directly referred as underwriters by default (Chemmanur & Fulghieri, 1994; Dunbar, 2000). For instance, in 2016, the top three underwriters as measured by the amount of proceeds raised in the IPO market were: Credit Suisse, Morgan Stanley, and Citicorp (Renaissance Capital, 2017c).

As stated in the earlier in this chapter, although hiring underwriters for an IPO is considered costly, when comparing the overall advantages and disadvantages, prominent scholars assume that issuing new shares with the help of underwriters is preferable because doing so saves time and energy.

Although a single underwriter is also capable of executing an IPO, in practice, the vast majority of offerings are syndicated, which means that other investment banks are recruited to help distribute shares. Statistics indicate that underwriters have increasingly participated in the IPO process: the average annual number of managing underwriters (the main

members in an underwriter syndicate) increased steadily, from 1,4 in 1975 to 6,4 in 2016 (Ritter, 2017).

Empirical studies have found several advantages of forming an underwriter syndicate, such as risk sharing, fair information practices, and increased monitoring of issuing companies (Yasuda, 2005). First, risk sharing is one of the primary reasons that a management group forms a syndicate. Using a sample of 1,535 bond issues, Yasuda (2005) found that the main function of lower-tier underwriters in a syndicate was risk sharing, which was also the main reason that they were initially invited to participate in the syndicate. Second, according to Yasuda (2005), the efficiency and comprehensiveness of information production was one primary reasons that top-tiers underwriters were invited to participate in a syndicate. Additionally, a study using a sample of 1,638 underwriter syndicates found a positive correlation between number of initial-price-related information revisions and the number of underwriters in the syndicate, i.e., fair information practices are more likely during initial price setting when a syndicate, rather than a single underwriter, is involved (Corwin & Schultz, 2005). Third, a syndicate can effectively increase monitoring of issuers, which is also considered a legitimate function of an underwriter syndicate (R. S. Hansen & Torregrosa, 1992). One direct result of increased issuer monitoring is that a well-monitored company is valued more highly than a relatively less monitored company (R. S. Hansen & Torregrosa, 1992; Jensen, 2001).

Among these reasons for forming a syndicate, the first reason (risk-sharing) directly benefits underwriters, and hence they are willing to collaborate with one another, despite the possibility that their individual compensation could be reduced. The second and the

third reasons benefit issuers: information processing reduces the level of underpricing in the short term, and increased monitoring increases companies' intrinsic value and decreases the likelihood of underperformance in the long term. Both underpricing and underperformance will be discussed in greater depth in chapter 2.

Furthermore, Pollock, Porac, and Wade (2004) argue that the key motivation for using a syndicate of other banks is to broaden the distribution of shares to ensure a mix of long-term and short-term investors, as well as investors with ties of varying strength to the underwriters. Completely homogenous networks are usually poor design choices because, at one extreme, they constrain market liquidity and, at the other extreme, generate excessive pricing volatility. Establishing relationships with varied investors takes time and resources, but it is an essential factor that determine the success of an IPO.

The typical syndicate is composed of three parts: the managing group, the underwriting group and the selling group. Note that memberships will overlap in some cases because this distinction is made with respect to function of each syndicate member.

1.2.1 The Managing Group

The company typically chooses two or three investment banks to act as managing underwriters, although the number may be smaller or larger in any particular case, depending on factors such as the size of the offering and the level of interest among underwriters. In practice, most IPOs count more than one manager. If more than one managing underwriter is selected by the company, one of the managers will be designated

as the “lead” manager (also sometimes called the “book runner”) with the other managing underwriters referred to as “co-managers.” In certain cases, there may be two lead managers, who are typically referred to as “joint book runners”. If there are joint book runners, there is typically an agreed allocation of authority and responsibility among the joint book runners. In addition to establishing the roles in managing the IPO process, the designation as a lead manager or co-manager impacts the allocation of the underwriting fees and discounts. It is up to the company to determine which bank will be the lead manager and which bank or banks will be the co-managers.

Lead underwriter

The lead underwriter is the head of the management group. The lead manager plays the dominant role with respect to the structure, allocation, timing and pricing of the offering, the preparation of the registration statement and the organization of the road show.

The recruiting and organizing function, which selects the underwriters that will be invited to participate in the syndicate, is a unique function that the members of other groups are unable to exercise (Cheolwoo Lee, Jeon, & Kim, 2011).

Theoretically, lead underwriters are important because they determine the members of the syndicate but, empirically, lead underwriters influence issuers in various ways. For instance, results indicate that more prestigious lead underwriters were involved in IPOs with lower money left on the table (lower first-day returns) because such underwriters tend to choose issuers with lower issuing risk (Carter & Manaster, 1990).

Co-manager

The other role in the management group is the co-manager. Typically, there is more than one co-manager in an underwriting syndicate, all of which are chosen by issuers in a similar process to that used to select the lead underwriter (H. C. Chen & Ritter, 2000; Ellis et al., 2000).

Before the 1980s, there was no co-manager. Thereafter, the average number of co-managers in an underwriter syndicate has consistently, from 0.4 in 1980 to 5.5 in 2016 (Ritter, 2017). In addition to the abovementioned advantages of using an underwriter syndicate over a single underwriter, other reasons responsible for the growing number of co-managers participating in an IPO can be interpreted from the perspectives of co-managers and issuers. From the perspective of co-managers, specifically investment banks and commercial banks, they would be interested to become co-managers even if they fail to be chosen as lead underwriters for two main reasons. First, the responsibility of co-managers is substantially smaller compared with that of lead underwriters; for example, the former's role after an IPO concerning market making is limited (H. C. Chen & Ritter, 2000; Ellis et al., 2000), while the commissions they receive are relatively larger relative to the functions they execute. Examples from H. C. Chen and Ritter (2000) showed that, among all the three components of the underwriting commission (management fee, underwriting fee, and selling fee), the only part that differentiates the commissions of the lead underwriter and co-managers is the selling fee, which is proportional to the number of shares they each distribute or sell. Beyond this factor, the management fee and underwriting fee received by the lead underwriter and co-managers are identical. Second, future

collaboration between issuers and co-managers is highly likely, meaning that co-managers have an opportunity to be promoted to the lead underwriters for issuers' further equity offers, namely SEOs (Corwin & Schultz, 2005; Krigman et al., 2001). Krigman et al. (2001) showed that in a sample of 572 IPO firms issuing SEOs, approximately one-third of the sample (180 firms) switched their lead underwriters. Among these switchers, in 25.6 percent of the cases, issuers promoted one of their co-managers from the IPO to be the lead underwriter for their SEOs.

From the issuers' perspective, there are three main reasons for hiring co-managers. First, the fees issuers pay for the entire underwriting syndicate are fixed in most cases, namely, at 7 percent of the total proceeds that the new shares will raise on the stock market, calculated as the initial price multiplied by the number of issued shares (H. C. Chen & Ritter, 2000; Fernando, Gatchev, May, & Megginson, 2014). For instance, for a firm issuing 2 million IPO shares with an initial price of \$20 per share, the total commission for the entire underwriter syndicate is $7\% * (\$20 * 2)$ million = 2.8 million, regardless of the number of co-managers in the syndicate. Second, the more co-managers there are, the more analysts they will bring, and thus the more analyst earnings forecasts will be provided (Cliff & Denis, 2004; Loughran & Ritter, 2004). Hence, for issuers, the total commission they pay for the syndicate is constant, and more co-managers are likely to bring more analysts. Consequently, it is reasonable for issuers to hire more co-managers, especially for large issuing firms or a large amount of IPO issuance.

Based on the statistics from Ritter (2017), it seems that the number of co-managers has yet to reach its upper limit. Among the three parties, issuers, underwrites and investors, the

only parties that has the motivation to stop the number of co-managers from increasing are the members of the underwriting syndicate. When the entire syndicate receives a constant commission amount, the more co-managers there are, the less commission each syndicate member can obtain, which is especially true for the lead underwriter (H. C. Chen & Ritter, 2000).

How many co-managers will be engaged in an underwriting activity becomes a bargain between the lead underwriter and the issuer. No extant studies have documented any negotiations between lead underwriters and issuers on this topic, and there is no practical evidence concerning the outcomes of such negotiations. Thus, the outcome depends on who has the stronger bargaining position before the underwriter syndicate is formed.

For several authors, issuers hold the stronger position for two reasons: first, as stated previously, issuers are the final decision makers concerning their collaboration with underwriters (Fernando et al., 2005); second, among banks' business lines, the underwriting business is the main source of income for investment banks and commercial banks (H. C. Chen & Ritter, 2000).

1.2.2 The Underwriting Group and the Selling Group

In the previous subchapters, lead underwriters and co-managers were introduced as the management group that administrates the underwriting deal and recruit other members of the syndicate. In addition to these two parties, the literature tends to leave out other underwriters in the syndicate because they are the lower-tier underwriters and play

insignificant roles (Yasuda, 2005). However, in this thesis, as the three groups are differentiated according to functions instead of entities, underwriting and selling functions are being considered as well.

The managing underwriters may organize a larger group of investment banks to help bear the risk of the offering. The entire group of investment banks is referred to as the “underwriting group”. The managing group and the underwriting group together are known as the underwriters. The underwriters assume, in principle at least, financial risk for the amount of shares they have underwritten (Tortsila, 2001).

The underwriting group may, in turn, sell part of the offering through a selling group consisting of even more investment banks and broker/dealers. It is not necessary for the company to participate in the selection of the syndicate or selling group members, although the managing underwriters will often take into account any preferences expressed by the company. The underwriting group and selling group members other than the managing underwriters do not participate in the due diligence, drafting or road show processes.

There are several parties that might be hired as members of underwriting or selling group:

1. the previous, current, or potential future lenders of issuers (usually banks) (Bharath et al., 2007; Corwin & Schultz, 2005; Yasuda, 2005);
2. close business partners of the issuers (Corwin & Schultz, 2005);
3. parties that have personal ties with important individuals of the lead underwriter or the issuers (Corwin & Schultz, 2005).

Most likely, these members are hired primarily to maintain important business relationships for issuers, either to repay or reward the previous lenders or to develop existing relationships for the future.

Note, again, that because the syndicate is divided into three groups based on their functions instead of based on individual entities, overlaps among these groups exist. In other words, one individual identity (one investment bank or commercial bank) can work in more than one group. For instance, lead underwriters distribute the largest number of shares to primary investors and thus belong to the selling group. Hence, it is not the entire underwriting group or selling group that has few responsibilities or plays an insignificant role but the individual entities (investment banks or commercial banks) that are not part of the management group and are referred to as low-tier underwriters (Carter et al., 1998; Yasuda, 2005).

1.3 Investors in IPOs

There are several ways in which investors can be categorized. First of all, a key distinction between individual investors and institutional investors has to be made: that distinction will be instrumental for the following ones.

1.3.1 Individual investors vs Institutional investors

Individual investors include all individuals and small groups who invest in the financial market for either short-term or long-term gains. They constitute a very small portion of the total volumes generated on the stock exchange because of their low purchasing power. This is true in the case of almost all the stock exchanges in the world. Hence, they do not dominate much of the stock market. Furthermore, their financial planning and management is not very efficient, at least when compared to their counterpart.

An institutional investor is a non-bank person, entity or organization that buys and sells securities on behalf of its members. These market players typically invest in large enough quantities to qualify for preferential treatment, such as lower commissions and faster execution speed and play a critical role in how markets behave and how assets are priced.

Institutional investors include pension funds, insurance companies, endowment funds, banks, mutual funds and hedge funds.

A pension fund, also known as a superannuation fund in some countries, is any plan, fund, or scheme which provides retirement income (www.cfainstitute.org). Pension funds are pooled monetary contributions from pension plans set up by employers, unions, or other organizations to provide for their employees' or members' retirement benefits. Pension funds are the largest investment blocks in most countries and dominate the stock markets where they invest. When managed by professional fund managers, they constitute the institutional investor sector along with insurance companies and investment trusts. Pension funds are further split along various lines, including national, corporate, public and union.

Insurance companies are another institutional investor that invests the premiums paid by their customers to grow their profits. According to the latest available information published by OECD, insurance companies own more than \$25 trillion in assets globally. They are generally broken down into health, life and property categories.

Universities, charities and other non-profit institutes are also classified as institutional investors (endowment funds). These organizations are funded by contributions, grants and charitable donations in pursuit of a particular cause or purpose.

Major financial institutions like JPMorgan Chase & Co., Bank of America and Wells Fargo also fall under the institutional investor category. These banks provide deposit, credit and investing services to their clients.

Mutual funds are investment vehicles which pool money from multiple investors for purchasing securities. These funds are generally risk-averse in nature and focus on regular increase in the investment made in the stock market. They are regulated by the exchanges and hence it is mandatory for them to issue a prospectus which will clearly state out the objectives of the fund and the strategies to be implemented by them. Accordingly, they have to abide by the same which in turn shall infuse confidence in the investors. The funds are managed by a professional fund manager who has to manage the funds within the limits of the prospectus and maximise the returns within the ambits of the law. There are three primary structures of mutual funds: Open-Ended Mutual Funds, which permits investors to buy and sell the units at any point of time; Close-Ended Mutual Funds, in which shares are listed on the stock exchange and shares can be sold only to another investor in the market and not to the fund (Closed-end funds generally issue shares to the public only once, when

they are created through an initial public offering); Unit Investment Funds, that are issued only once upon their creation and, generally, have a restricted life span whereby the investors can redeem shares directly from the fund at any point of time or can choose to wait till the termination of the trust. Such funds do not have the services of a professional fund manager. There's a fourth structure of mutual fund that are structured as open-end investment companies or UITs: ETFs. ETFs combine characteristics of both closed-end funds and open-end funds. ETFs are traded throughout the day on a stock exchange. Most ETFs track an index, such as a stock index or bond index. ETFs may be attractive as investments because of their low costs, tax efficiency, and stock-like features.

Hedge funds are investment pools which are responsible for private collection of funds with the use of diverse and aggressive strategies for the purpose of earning regular and above normal returns for their investors. Numerically, mutual funds have a large number of investors with each having a limited investment whereas hedge funds have a small number of very large investments by each investor. Hedge fund investors are generally from the affluent sections possessing a very large risk appetite for absorbing losses which can hamper the entire capital investment. As an entry criterion, the offering memorandum of a hedge fund states the minimum investment required to be made by prospective investors and in most of the cases, this amount is not less than \$10 million. The fund is continuously managed by a Hedge Fund Manager who is completely responsible for the regular functioning and decisions of investment which will have an impact on the performance of the fund.

1.3.2 Pre-IPO investors vs Post-IPO investors

Based on the timing of their participation in the IPO process, investors can be categorized into three groups. The first group of investors is those who support startup companies, i.e., the issuers, before the latter's IPO. The typical representative of such investors are venture capitalists, whose main tasks are to invest in and fund promising startup companies (Fairchild, 2011; Megginson & Weiss, 1991; Tyebjee & Bruno, 1984). In the U.S., venture capitalists are the main source of capital for firms before they conduct an IPO, and hence the venture capital market is regarded as being closely connected to the stock market. As stated in subchapter 1.1.1, issuing an IPO is considered one of the common methods for venture capitalists to cash out their investments (B. S. Black & Gilson, 1998). Furthermore, a successful exit via issuing an IPO or making an acquisition is considered "a common measure for the success of a private venture-backed firm" (Lindsey, 2008).

Venture capitalists provide a certification function for IPO companies (Megginson & Weiss, 1991). The certification hypothesis was first advanced by Booth and Smith (1986), who proposed the relationship between capital raising and underwriting, whereby reputable capital ought to support high-quality products. Similarly, the certificate function served by reputable venture capitalists should also signal that the IPO companies they have invested in are of better quality relative to their peers (P. M. Lee & Wahal, 2004; Megginson & Weiss, 1991). Furthermore, according to Lindsey (2008), companies that are funded by the same venture capitalists are more likely to form strategic alliances. Venture capitalists provided advantages such as information utilization and resource sharing to facilitate the formation of such alliances. The nexus function is possible because while investing in

different companies, venture capitalists obtain detailed information, such as the firms' strategies. This access to important information provides venture capitalists with the ability to create profitable alliances among the companies in which they have invested. Most of these alliances were found to be research and development (R&D) alliances, marketing alliances or alliances between companies from the same industry (Lindsey, 2008).

The second type of investors are primary investors who are allocated initial shares before the initial date. According to the literature, in most circumstances underwriters will allocate the initial shares to institutional investors or individual investors with large amounts of capital. Thus the second type of investors is primarily represented by institutional investors (R. Aggarwal, Prabhala, & Puri, 2002; Jenkinson & Jones, 2009).

The third type of investors begins to invest their capital when the IPO shares become publicly tradable, i.e., after the initial date. They can be both institutional investors and individual investors (Agarwal et al., 2008; Brau et al., 2007).

1.3.3 Sophisticated vs Unsophisticated investors

Based on the ability of investors to process information, investors can be split in sophisticated investors and unsophisticated investors.

Harris (2003) suggest a broad definition of "informed investor" that is strictly related to sophisticated investors definition. In such definition, he includes not only those who have

confidential information, but also investors who can conduct costly and complex analyses and researches.

Institutional investors are considered more sophisticated information processors while the majority of individual investors have been described as irrational investors (Verma & Soydemir, 2009), naïve investors (Hirshleifer et al., 2008) or unsophisticated investors (Mahani & Potesman, 2008). For instance, Mikhail, Walther, and Willis (2007) showed that institutional investors differed from individual investors in the following respects: first, institutional investors react according to the information provided in the analysts' recommendations or forecasts, whereas individual investors tended to react regardless of how informative the recommendation and forecast are; second, the authors found that institutional investors were net sellers when the recommendations were sell or strong sell, but individual investors were net buyers regardless of whether the recommendation was buy or sell. Furthermore, individual investors have a stronger tendency to engage in herding behavior than do institutional investors, and hence the likelihood that individual investors will engage in dangerous market-destructive trading behaviors is higher than that of institutional investors. Additionally, IPO share performance at this stage can be easily destroyed by a large amount of irrational and biased trading, and thus it is unsurprising that underwriters are more willing to distribute IPOs to institutional investors than to individual investors. This issue will be looked in depth in subchapter 1.4.

1.4 The IPO process

Going public is a complex and time-consuming process. Draho (2004) showed that “internal preparations for the IPO can begin up to two years prior to the offer date”.

The process of going public is the aggregation of all IPO-related activities and events that take place in the time interval between the selection of the lead manager and the first day of public trading. Thus, a company must choose the stock exchange for the listing of its shares, select the underwriter and the auditor, decide the type of the offering. Once the process is started, a company must work closely with the underwriter, produce the information required by regulatory authorities, undertake road shows and manage the relationship with the market. The various steps involved in an IPO are described and analysed in the following paragraphs.

1.4.1 The choice of the stock market

Before issuing shares to the public, a company must choose which stock exchange to list its shares on. Firms going public often choose their domestic stock exchange but, in recent years, as described by Jenkinson and Ljungqvist (2001), with the increasing irrelevance of national boundaries, thanks to the spread of electronic trading, and the increasing competition between stock exchanges, companies have become more and more free to choose where to have their shares listed.

In the US, the major markets are the New York Stock Exchange (NYSE) and the NASDAQ Stock Market. In Europe the two largest stock exchanges by market capitalization are Euronext and the London Stock Exchange. Every stock exchange has different segments and every segment has its own listing requirements. For example, the NYSE has more stringent requirements and standards with respect to the NASDAQ (in terms of offering size, firm's total assets, revenue and profitability); as regards different segment, in UK, for example, companies listed in the AIM segment or techMARK are subject to less regulation than the ones listed on the Official List. Firms going public must respect and satisfy the listing requirements and the regulations imposed by the market in which they seek the admission. After verifying the compliance with the requirements, companies must submit an application to the stock exchange. The choice of the stock market not only depends on the specific financial requirements and on the minimum listing standards imposed by the regulatory body of each stock exchange. Indeed, it is also important to consider the costs associated with the listing and, above all, the effects that the different market can have on the image and visibility of the firm. For example, a high-tech company should choose NASDAQ to improve his visibility and obtain a good reputation because best innovative tech companies in the world are listed in it (Taulli, 2000).

1.4.2 The selection of the underwriter

Generally, the management of a private company has never started an IPO process before and so lacks detailed knowledge of the stock market. Investment banks can then offer their

know-how and exploit their experience in the stock exchange listing, their network of knowledge between investors (above all institutional investors), their reputation on the market and their competencies, in order to increase the firm's visibility and help in making the necessary changes that a company going public must fulfil. Thus, hire an external underwriter is essential, except in one case: when institutional investors go public, they usually conduct the entire IPO process by themselves. For instance, Goldman Sachs went public in 1999, serving itself as the lead underwriter (R. Aggarwal, 2003).

As stated in subchapter 1.2, initial public offerings are managed and controlled by the underwriter that provide different services: first of all, it has to perform a "due diligence" investigation in which it analyses the financial situations of the company and verify that capital requirements are satisfied, then it has to collaborate with the company to prepare and drawn up the prospectus, in addition it has to underwrite the stock offering assuming part of the risk associated with the issue proceeds and, finally, it has to sell the shares to the public and allocate them to investors. Underwriters play also a relevant role in determining the pricing of the shares and the timing of the listing, and in supporting the marketing phase of the IPO.

Hence, the selection of lead underwriters is of significant importance. There are two theoretical models describing lead underwriter selection in the extant literature: the mutual selection model and unidirectional selection model. The mutual selection model emphasizes the opinions of both sides, i.e., how underwriters and issuers choose one another (Fernando, Gatchev, & Spindt, 2005). The theoretical support for this model is that both issuers and underwriters may have a substantial impact on one another in terms of

further public offerings, long-term performance, reputation, and so forth. In this model, the final deal is based on a two-sided mechanism. Specifically, underwriters consider the quality of the issuers, such as the amount of issues, the likelihood that the IPO will be approved by the SEC, the long-term performance of the issuing firms, and the likelihood of future cooperation, i.e., whether issuers will issue secondary equity offerings (SEO). Issuers consider the capabilities of underwriters, especially the services they can offer, including their certification, promotion, allocation and further support for the IPO shares (Fernando et al., 2005). Instead, the unidirectional selection model emphasizes factors influencing issuers' choice of lead underwriters and underwriters' opinions are not considered.

In practice, for instance in the U.S., issuers are the final decision makers concerning whether they will collaborate with lead underwriters. The issuer selects the lead underwriter through a so-called beauty contest or bake off stage, where multiple teams of investment bankers one by one present themselves and their offer to the company. In that contest, competitiveness is "bloody", in the sense that each participant tries hard to take advantages offering the best conditions. That desire to be the lead underwriter lead in the past to unfair behavior like "spinning".

When choosing managing underwriters, a company should consider the factors listed below:

a) Analyst coverage

Analyst coverage is essential to maintaining investor interest in a company's stock following its IPO. Without it, the market for the company's stock may be relatively illiquid, volatility of the stock may be heightened and follow-on offerings may be difficult to place. This type of analyst is known as a "sell-side" analyst, and is typically an employee of the underwriting firm (though there are independent analysts that are not part of firms that underwrite equity offerings). The role of the sell-side analyst is to research a particular industry and the companies in that industry, and to report on the results of that research and make predictions about the anticipated performance of the industry, the companies and their securities. The sell-side analyst's reporting is outward facing, intended for the potential purchasers of securities who are brokerage customers (or potential brokerage customers) of the securities firm for which the analyst works. Sell-side analysts are to be contrasted with buy-side analysts, who typically do similar investigatory work, but whose reporting is internally facing, intended for the financial institution employing them in buying decisions on behalf of the institution itself. The buy-side analysts figure into the IPO process as well by attending road show presentations to glean information about the company to determine whether the analyst's institutional employer should purchase the IPO securities. The role of analysts in the IPO process, as well as after the IPO, has undergone intense scrutiny in recent years as a result of the analysts' high profile in the late 1990s, their increasing power to influence stock prices and the widespread perception that analysts were tainted by a raft of conflicting interests. These conflicts included perceived entanglement of research analysts with the investment banking/underwriting side of the

analysts' firms' business and perceived entanglement between the analysts and the companies on which they report. Analysts conflict of interest will be discussed in Chapter 3.

b) Track record with similar IPOs

Underwriters that have successfully placed the stock of similar companies may be more likely to have relationships with investors that would be interested in purchasing the company's stock. Relationships with customers, suppliers and competitors of the company may indicate a deeper understanding of the company's industry and a real commitment to providing analyst coverage in that area. However, this must be weighed against the possibility of conflicting loyalties, problems in handling the company's confidential information and an inability to provide evenhanded advice in certain acquisition situations.

c) Underwriter compensation

High spreads represent a relevant cost for a firm going public but the convergence to a common spread eliminates, totally or in part, compensation cost as an underwriter selection criterion. In some cases, especially in best efforts agreement, investment banks receive an additional compensation in the form of warrants. A warrant grants the underwriter the right to buy firm's shares at a fixed price (exercise price) that is lower than the offer price.

d) Reputation

Some investment banks are more respected than others, either in general or for their expertise in particular market segments. For investors whose first introduction to the company is through the IPO, the reputation of the managing underwriters may have a

significant influence on the perceived quality of the investment and, in turn, may even influence valuation. The traditional certification hypothesis suggests that in repeat business reputable underwriters can, because they put their reputations at stake when acting as certifiers, credibly certify issuer quality to less informed investors (see, for example, Booth and Smith 1986, Titman and Trueman 1986, and Allen 1990). Furthermore, prestigious underwriters were found to be associated with low-return IPOs, i.e., IPOs with a lower amount of underpricing in the short term (Carter & Manaster, 1990). In the long term, specifically a three-year holding period, more prestigious underwriters were found to be associated with less severe IPO underperformance (Carter et al., 1998). However, the correlations between underwriters' reputation and the amount of underpricing vary across samples from different countries.

e) Distribution capabilities and focus

Among the most critical aspects of choosing an underwriting team is ensuring that the company has underwriters who are going to be able to complete the distribution, and are going to be able to get the company's shares into the hands of the right investors (e.g. to avoid excessive flipping). Companies should ascertain the bank's distribution capabilities and objectives, its key institutional accounts, whether the bank will be able to build a quality syndicate to achieve optimum distribution, liquidity and visibility for the company's offering. Moreover, different underwriters may have different strengths in terms of types of technologies. They may also differ as to the regional strengths of their institutional investor relationships. For example, some firms may have stronger connections with East Coast institutional investors. So, if a company chooses a West Coast

based lead managing underwriter for some reason, and yet wants to make sure that East Coast institutional investors take positions in the company, the company would be well served to ensure that one of the co-managers (or, at a minimum, one of the other syndicate members) is an underwriter with strong connections to East Coast institutional accounts. Strategizing the makeup of the underwriting team with a view to leveraging their various strengths in terms of reach to investors is a matter on which the company should work closely with the lead managing underwriter (P. j. Schultheis et al., 2008).

f) Aftermarket support

While sales execution is critical to a successful IPO, post-offering market support can be just as important. In order for the trading price of the stock to accurately reflect the underlying business fundamentals and not be distorted by liquidity concerns, there must be a fluid and efficient market in the company's stock. This requires a few strongly capitalized firms that act as market makers, and stand ready to buy and sell the company's stock at the market prices, so that trading can continue efficiently at all times. Aftermarket support also includes the ability to help the company get other analysts interested in covering the company, and attracting large institutional investors to the company's stock after the IPO. In determining a prospective investment bank's aftermarket support capabilities, a company should request that the bank provide its track record in terms of aftermarket performance of other IPOs it has managed.

g) Previous lending relationship

Ljungqvist, Marston, & Wilhelm (2006), by analyzing 16,625 US debt and equity offerings (including IPOs), assert that the main factor influencing lead underwriter choice was found to be the previous lending and underwriting relationships with banks. For IPOs, the dominant factor is the lending relationship because there cannot be any previous underwriting relationship.

A bank formally becomes underwriter when it signs the underwriting agreement. The underwriting agreement is the principal written document outlining the rights and obligations of the company, the underwriters and any selling stockholders. Each investment banking firm has its own form of underwriting agreement, and the form of the lead manager is the form that will be used for a given offering. The underwriting agreement is, in its essence, a formal contract that acts as a purchasing contract between the issuer and the underwriter. There are three principal forms of the contract: “firm commitment”, “best efforts” and “all-or-none”. In the firm commitment contract, the underwriter guarantees to purchase all the shares issued at a fixed price discount and to absorb the eventual loss generated by unsold shares. In the best effort contract, instead, the underwriter makes an effort to sell firm’s stocks but does not guarantee the proceeds to the issuer and unsold shares return to the issuer. This form of underwriting has become uncommon in recent years. In an all-or-none underwriting, if the entire issue is not sold, then the issue is cancelled, and investors’ money collected will be returned.

1.4.3 The Due Diligence phase and the drafting of the prospectus

At the beginning of the issuer-underwriter relationship, there is an initial information-gathering phase. The bank chosen as the lead manager performs the due diligence investigation which includes financial, business, legal and accounting due diligence. Generally, due diligence consists of company inspections and meetings, interviews, question-and-answer sessions with senior and operational managers of the firm. Due diligence is needed to ensure that all necessary and relevant information about the company is accurate and complete. In the business due diligence, the underwriter examines the company's activities and business operations; in the financial due diligence, instead, it analyses firm's capital structure, business plan and financial forecasts. In addition, in the legal and accounting due diligence, the underwriter inspects contracts (for example, contracts with main customers and suppliers), legal documents, accounts ledgers, governmental authorizations, material agreements and other documents relating to intellectual property, environmental issues and current and pending litigation. Finally, the underwriter also verifies managers' qualifications and experience to run the firm. The due diligence investigation is performed in parallel to the preparation of the initial prospectus. All the information gathered in the due diligence phase is used to draft an initial (or preliminary) prospectus that, in the US, is also known as "red herring" prospectus because of the red band of legal terms running vertically on the left hand side of the cover of the prospectus. The information contained in this preliminary document are usually not complete and subject to change. The preliminary prospectus specifies only a possible price range for the offering as the firm is not permitted to sell shares prior to SEC registration.

“The prospectus is, legally, the only publication that investors should use in order to make an investment decision to buy shares [...] in an IPO” (Espinasse, 2014) and, so, the initial prospectus is the primary source of information accessible to all investors. It contains information regarding the issuer, the firm’s business and strategy, the company’s competitive advantage and potential risk factors, the quality of the management, the use of proceeds and, also, information about principal shareholders and the investment bank chosen as underwriter. It also contains a legal opinion and information about the risks of the issue. Once the prospectus is completed, it’s marked as preliminary and submitted to the SEC for approval. Companies, in general, submit the registration statement on Form S-1. The Form S-1 registration statement consists of two parts. Part I contains most of the information about the company’s business and financial condition. The prospectus, which is the portion of the registration statement delivered to investors, is Part I of the registration statement without the Form S-1 cover page. Part II of the registration statement contains supplemental information not required to be included in the prospectus, such as information regarding offering expenses, indemnification of officers and directors of the company, recent sales of unregistered securities, undertakings and exhibits and financial statement schedules. Part II is not required to be delivered to investors, although it is publicly available. Form S-1 requires several documents and detailed data; for this reason, small issuers can use Form SB-1 and Form SB-2 that require less specific information and a less complex procedure than Form S-1, to register their offerings. Once received the registration statement, the SEC’s Division of Corporate Finance must verify its accuracy and conformance to disclosure requirements and within approximately 30 days, the SEC will send the issuer a letter of comment asking for additional disclosures and request

amendments to the registration statement. The issuer sends a response and after several exchanges of letters, the SEC will approve the prospectus and all the other documents, the registration statement becomes effective or in legal compliance. When this happens, the prospectus may be distributed to potential investors. But it's still preliminary and contains the red warning notice.

Typically, the preliminary prospectus is used to gauge interest in the market for the security being proposed and it comes in tandem with the issuer's IPO roadshow. Once a road show is completed, the final prospectus is created and distributed to potential investors. Despite everyone does analysis of an offering using the preliminary prospectus, legally the final prospectus is important. It is the official, complete disclosure of all facts relating to the offering, with the specification of the final price and the number of shares offered. The document must be approved by the market authority (e.g., in the US, by the SEC, "Securities and Exchange Commission"); the investment bank and the issuer are liable for its content. A company is not allowed to sell its shares until the registration of the final prospectus filed with the SEC is effective.

1.4.4 Marketing Phase

The IPO marketing phase starts with important pre-marketing activities, which are also known as pre-deal investor education (PDIE). The investment bank's analysts prepare a Pre-IPO Research Report about the company, which is used to educate institutional investors on the firm's investment case. The Research Report contains the analysts'

valuation and company's financial projections. Pre-deal investor education is important because it permits to collect investors' feedbacks and their interest in participating in the IPO, so as to help the underwriter in determining a price range for the issue. In the last couple of weeks (in general 2 or 3 weeks) prior to the listing, once the preliminary prospectus has been printed and distributed, the managing group and the underwriter group conduct the roadshow. Roadshows are a series of short meetings in which the management of the issuing company and the underwriter present the issue to potential investors (both retail and institutional investors). Meetings can take place in different financial centre (including the city in which the stocks will be listed); they can include presentations to a large audience and "one-on-one session" with the most important investors. Roadshows presentations do not add new information about the firm and "merely reiterate fairly general information already contained in the prospectus. Perhaps surprisingly, road shows may instead be a way for the investment banker to gather information from investors, about their views of the company and its valuation. [...] The marketing phase thus generates a lot of additional information regarding the reaction of the potential investors to the offer, which can be fed into the next stage of the process when the final price is set" (Jenkinson and Ljungqvist, 2001). These meetings are, indeed, "a key tool in testing the market appetite for the IPO" (Yates and Hinchliffe, 2010): in this phase, investors are solicited to make non-binding bids but, "in practice, even though such institutional bids may not be legally binding, there is a strong presumption that investors should be prepared to pay their bids". (Jenkinson and Ljungqvist, 2001). Thanks to information gathered from meetings, underwriter can create a book of orders useful to determine the final price of the issue. That method used by underwriters to assess demand is called book-building (R. Aggarwal,

2003). Part of the roadshow's function can be considered the initiation of the book building process because it provides information on, for example, potential investor demand, the expected price per share, and the length and number of shares that the secondary market is willing to bear. (R. Aggarwal, 2003; Certo, 2003). In addition to the roadshow, there are also other forms of marketing for an IPO, like press briefings and advertising. Marketing campaign is critical and, as stated by Kuhn (1990), it "will determine the success or failure of the IPO. The key is to stimulate investor demand for the stock so that, as in basic economics, the demand will exceed the supply." According to Cook, Kieschnick and Van Ness (2006), who analysed a sample of US IPOs from 1993 to 2000, marketing is also critical for the aftermarket performance of the IPO; in their paper entitled "On the marketing of IPOs" (2006), they reported that there is "a positive and significant correlation between retail trading activity during the first day of trading in an IPO and the IPO's pre-issue publicity, [...], pre-issue publicity is positively correlated with upward revisions in IPO offer prices and offer price valuations that are above comparable firms in their industry, [...], insider wealth exceed their dilution losses when more pre-issue publicity is associated with their IPO, [...], initial IPO returns are positively correlated with pre-issue publicity, and [...], investment banker compensation is positively and significantly correlated with pre-issue publicity".

1.4.5 IPO Pricing

The final steps of the IPO process involve the pricing and the allocation of firm's shares. As sustained by Espinasse (2014): "pricing and allocating an IPO is really more of an art than a science. It needs to take into account the priorities of the issuer, of the selling shareholders (if any) and of the investors so as to encourage aftermarket buying and a steady increase in the share price". The science part is based on valuation methods, while the art consists in determining the market's interest in the offering (Iannotta, 2010). According to Sindelar, Ritter and Ibbotson (1994), the pricing of IPOs is a difficult process because it is not possible to observe market price prior to the offering and also because issuing firms are, generally, young companies with little operating history. The offer price must reflect the fundamental value of the company and must be aligned with the valuation of comparable firms ("peer comparison"). At the same time, it must also take into consideration issuer's and underwriter's interests, investors' feedbacks and financial market conjuncture. Sindelar, Ritter and Ibbotson (1994) stated that "if the price is set too low, the issuer does not get the full advantage of its ability to raise capital. If it is priced too high, then the investor would get an inferior return and consequently might reject the offering".

There are three different IPO pricing mechanisms: book-building, fixed-price offering and auction. Nowadays, the most popular mechanism worldwide is book-building. It has gradually driven out all other methods. Draho (2004) asserted that "issuers, underwriters and institutional investors appear to universally favor book-building when given the choice", but he added that "by and large, issuers do not get to choose their IPO mechanism.

Either regulatory constraints limit the choice or market forces dictate that certain types of issuers must use a particular method". In fixed-price mechanism, the issue's final price is already specified in the preliminary prospectus and is chosen prior to collecting orders from investors; so, it is not influenced by market's demand and cannot be adjusted in response to excess supply or demand. Normally, fixed-price offerings are used when the underwriting agreement is a best-effort contract; the underwriter does not actively sell the shares but it only distributes the prospectus, collects orders and performs share allocation with limited discretion. The book-building mechanism is, instead, typical of firm commitment contract and it is characterized by more discretion permitted to the lead underwriter and to the issuer in pricing and allocating the shares. It can be divided in three main steps. In the first one, the underwriter, after having distributed the preliminary prospectus which contains a preliminary share price range, determines which investors are invited to participate in the book-building process. In general, investment banks consider only institutional investors in this process and exclude retail ones. Retail investors are not invited, as discussed by Jenkinson and Ljungqvist (2001) given "the infeasibility of inviting and discussing the issue with a large number of small investors", and because they "may typically be less informed as to the value of the company than professional investors". In the second step, investors communicate their interest and submit their bids. Bids can be strike bid, in which the investor accepts to buy a given number of share at whatever price is set within the preliminary range, or limit bids, in which the investor divides its bid in different price-quantity combination and communicates a price above which he does not consider the purchase. This step is usually performed during the roadshow and it is a dynamic process, "with the investors and investment bank both getting a feel for the state

of demand and with investors revising their bids as the process evolves” (Jenkinson and Ljungqvist, 2001). Indeed, if during the book-building process it results that the demand is very strong (or very weak), underwriters can revise the range of the offer price and investors can submit new bids. In the final step, the underwriter determines the final price and allocates shares. Despite knowing investors’ demand curve, the final price is not determined only by matching demand and supply, but the investment bank maintains a significant discretion in setting the price and allocating the shares.

The last alternative mechanism that underwriter and issuing firm have to price the issue, is auction; even if, in practice, they can also use hybrid offerings mechanisms which combine book-building and fixed price or book-building and auction. With auction underwriting, the underwriter does not set a fixed price for the shares to be sold. Instead, the underwriter conducts an auction in which investors bid for shares. The offer price is determined based on the submitted bids. There are two main auction models: single-price auction, in which all investors pay the same price, and discriminatory-price auction, in which all investors pay what they bid. This approach to selling securities to the public is relatively new in the IPO market and has not been widely used there, but it is very common in the bond markets: it is the sole procedure used by the U.S. Treasury to sell enormous quantities of notes, bonds, and bills to the public. Suppose a company wants to sell 400 shares to the public.

The company receives five bids as follows:

Bidder	Quantity	Price
A	100 shares	\$16
B	100 shares	\$14
C	200 shares	\$12
D	100 shares	\$12
E	200 shares	\$10

Thus, bidder A is willing to buy 100 shares at \$16 each, bidder B is willing to buy 100 shares at \$14, and so on. The company examines the bids to determine the highest price that will result in all 400 shares being sold. So, for example, at \$14, A and B would buy only 200 shares, so that price is too high. Working our way down, all 400 shares won't be sold until we hit a price of \$12, so \$12 will be the offer price in a single price auction. In a discriminatory-price auction A will pay 16\$, B will pay 14\$ and so on. Despite the auction model used, bidders A through D will receive shares and bidder E will not.

1.4.6 Allocation of the Shares

Allocation of the shares depends on the pricing mechanism used. In general, there is no pricing and allocation discretion provided by auction mechanism. Once decided the model of the auction, the underwriter has a passive role. "The bids are effectively anonymous, as shares are allocated in a non-discriminatory basis to institutional and retail investors" (Draho, 2004).

In fixed-price offerings, several allocation mechanisms reflecting the market's regulations are used in different countries. The most common is "fair allocation system", in which share allocation is performed pro rata when the issue is oversubscribed. Many countries allow some kind of discrimination based on order size or in favor of particular types of investor, but, generally, "fixed-price offerings provide underwriters with no discretion because shares are simply allocated on a pro rata basis" (Ljungqvist and Wilhelm, 2002).

As described by Jenkinson and Ljungqvist (2001), "the sorts of non-discriminatory rules that often apply to fixed price offerings do not apply to book-building efforts: the underwriter, in consultation with the issuing company, will have complete discretion over who is allocated shares. This discretion over allocation is one of the controversial aspects of book-building, in part because not all investors are able to take part in the book-building in the first place". Allocation discretion is used to reward investors that reveal positive information during book-building process and, as stated by Iannotta (2010) and Ljungqvist and Wilhelm (2002), the empirical evidence confirms the fact that more informed investors (i.e. institutional investors) receive larger allocations. Underwriters primarily allocate IPO shares to institutional investors for the following reasons. First, underwriters want to compensate the institutional investors for giving away their accurate demand information during the book-building stage (Ritter & Welch, 2002). Second, underwriters want to maintain certain relationships with institutional investors as their long-term clients (Sherman, 2000). Third, underwriters to avoid flipping activities tend to distribute the initial shares to institutional investors that did not engage in flipping activities in their previous collaboration, i.e., to the loyal clients (R. Aggarwal, 2003). Flipping will be

discussed in more detail in Chapter 2. Fourth, institutional investors are considered sophisticated investors that might be less likely to engage in irrational investment behaviors than are individual investors (Field & Lowry, 2009).

1.4.7 Listing and Trading

Once the IPO pricing and allocation have been performed, secondary market trading starts usually after a couple of days. Generally, the first days are characterized by volatility and a trading volume extraordinary high as some investors continue to buy shares and others sell their allocations to obtain a short-term profit. The lead underwriter plays an important role in stabilizing the price of the shares at this stage. Price stabilization activity is aimed at absorbing the excess supply of shares and avoid excessive price fall in order to protect investors against downside risk in the first trading period. The lead underwriter starts “to buy shares in the aftermarket in the event of pressure for the share price to fall (in particular below the issue price) and to sell more shares (either at the time of the IPO or in the aftermarket) in the event of high levels of excess demand for the shares” (Jenkinson and Ljungqvist, 2001). In addition, an overallotment option might safeguard price stability. The overallotment option is also referred to as the “green shoe” option. In the U.S., it allows underwriters to purchase an additional 15 percent of the shares sold in the IPO at the offering price, within 30 days (R. Aggarwal, 2000; Fische, 2002). In other words, underwriters can distribute up to 115 percent of the planned issuance size to the primary investors, of which the portion above 100 are shorts and then purchase this number of

shares on the public stock market after the initial date. For instance, if the initial offerings are cold issues, meaning that investor demand is below the volume of new offerings, underwriters' purchasing behavior after the initial date will drive up demand in the secondary market and prevent the stock price from falling below the initial price. In such a situation, underwriters have to purchase the stock at the current market price, which is likely below the initial price in the case of cold issues, while they have already received payment from the primary investors before the initial date, and thus their risk of cold issues is buffered by exercising the overallotment option (R. Aggarwal, 2000). For example, assume that the underwriter has sold 1.15 million shares of an IPO at the initial price of \$20 per share and an issuance size of 1 million. If the first-day closing price after the initial date turned out to be \$30 per share, this IPO could be considered a hot issue with a first-day return of $(\$30 - \$20) / \$20 = 50$ percent. Thus, underwriters would have to pay an additional \$10 per share to make up for the short position they created before the initial date.

Stabilization activities last usually for two weeks after the first day of listing and the possibility to perform price stabilization must be disclosed in the IPO final prospectus. The underwriter can also provide analyst coverage of the company after its IPO and help to develop an effective communication program, with which it is possible to ensure a steady flow of information to new investors.

In addition to stabilization, almost all underwriting contracts contain so-called lockup agreements. Such agreements specify how long insiders must wait after an IPO before they can sell some or all of their stock. Lockup periods have become fairly standardized in recent years at 180 days. The purpose of an IPO lock-up is to prevent the flooding of the market

with too much of a company's stock supply too quickly. A single large shareholder trying to unload all of his holdings in the first week of trading could send the stock downward to the detriment of all shareholders. On the day the lockup period expires, there is the possibility that a large number of shares will hit the market on the same day and thereby depress values.

Moreover, the SEC requires that a firm and its managing underwriters observe a “quiet period”. This means that all communications with the public must be limited to ordinary announcements and other purely factual matters. The quiet period begins after the pre-IPO research report and ends at minimum after 10 calendar days following the IPO (FINRA rule 2241). The SEC’s logic is that all relevant information should be contained in the prospectus. An important result of this requirement is that the underwriter’s analysts are prohibited from making recommendations to investors. This rule, which is compulsory in the US, is more a market practice in other countries. The purpose of the quiet period is to avoid booster-shoots, i.e., analysts’ recommendations aimed at increasing market demand and driving up the price. As soon as the quiet period ends, however, the managing underwriters typically publish research reports, usually accompanied by a favorable “buy” recommendation.

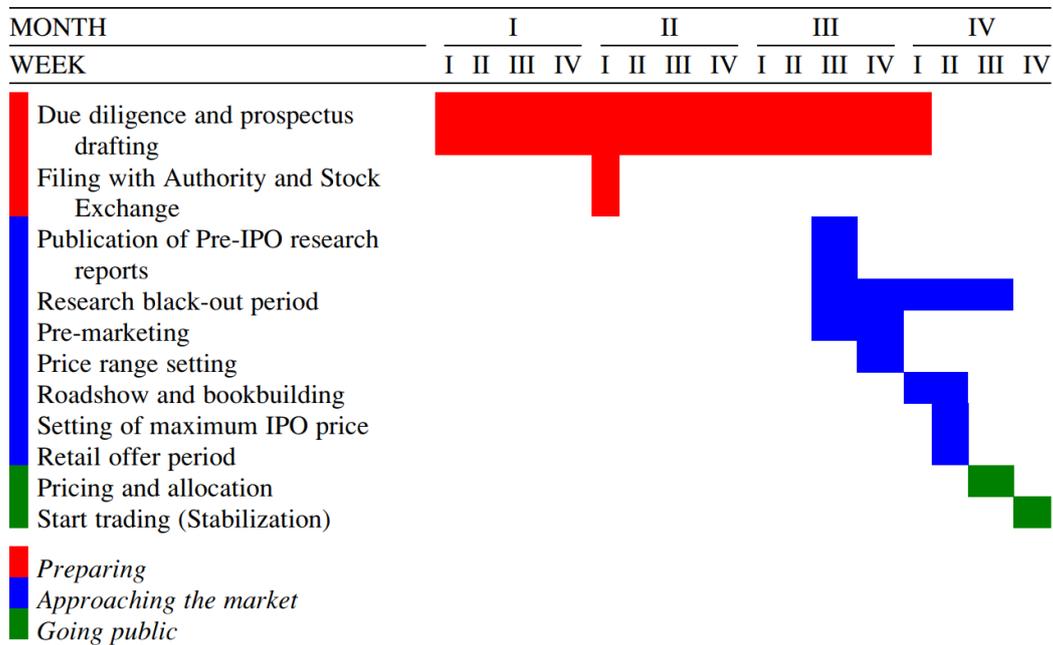


Figure 1.1 – IPO timeline. Source: *Investment Banking: A Guide to Underwriting and Advisory Services*, Iannotta, 2010.

2. Underpricing and Long-run Underperformance of IPOs

The process of going public is associated with several anomalies, the most well-known of which is the underpricing phenomenon: in the primary market firms sell their shares below the prices investors appear willing to pay when the stocks start trading in the secondary market. In recent years, academic researchers have also focused their attention on the long run performance of newly listed firms. The evidence which has emerged from several studies is that during the first few years of their public listing IPOs underperform comparable benchmarks (Loughran et al., 1994).

The underpricing and long-run underperformance of newly listed firms attract great interest because both anomalies have several implications on all IPO players. First, to issuing firms. Underpricing increases the costs of making an IPO because, in addition to the direct costs incurred in going public, it leads to a decrease of capital raised. Moreover, if IPOs underperform in the long run, issuers suffer an opportunity cost of low returns on the shares they retain. Second, to primary market investors. If new offerings are offered at a discount, investors fortunate enough to buy shares at the offering price will be able to earn significant abnormal returns by selling them once trading begins in the secondary market. In addition, the tendency of IPOs to perform poorly in the long run will discourage primary market investors from holding shares beyond the first days of trading. Third, to secondary market investors. If new offerings systematically and consistently underperform in the long run,

investors who were not able to buy shares at subscription will not be keen to invest in IPOs but would rather seek alternative investments. Fourth, to underwriters. If underwriters price IPOs above their true market values, investors might reject the offering because they would receive an inferior return. Investors, moreover, will not be willing to participate in IPOs priced by underwriters having a record of overpriced issues. On the other hand, if underwriters price new offerings too low, thereby depriving issuers the full advantage of their ability to raise external equity capital, potential issuers may not be keen to go public. Finally, to academics. The ability of investors to earn significant abnormal returns, as well as the tendency of new offerings to produce nonzero returns in the long run, raise questions as to the informational efficiency of the market for IPOs.

The objective of this chapter is to provide a description of post-listing price behavior of IPOs.

2.1 Underpricing

Underpricing of IPOs is measured as the difference between the closing price and the offer price (or issue price) all divided by the offer price. The closing price refers to the price registered at the end of the first trading day when the IPO gets listed on the stock exchange.

Underpricing can be defined as:

$$\text{Underpricing} \\ \text{(or first-day return)} = \frac{P_{i,1} - P_{i,0}}{P_{i,0}}$$

where $P_{i,1}$ is first day closing price and $P_{i,0}$ is the IPO offer price.

Otherwise, it can be calculated using the market adjusted first-day return, which also takes into consideration the general performance of the stock market in the time lag between the closing date of the subscription of the shares and the first day of trading:

$$\begin{aligned} & \textbf{Market-Adjusted} \\ & \textbf{Underpricing} \\ & \textit{(or Market-adjusted first-day} \\ & \textit{return)} \end{aligned} = \frac{P_{i,1} - P_{i,0}}{P_{i,0}} - \frac{MI_{i,1} - MI_{i,0}}{MI_{i,0}}$$

where $MI_{i,1}$ is the market index at the end of the first trading day, while $MI_{i,0}$ is the market index at the end of the shares subscription period. MI can be, for example, respective national stock index or other indexes of the stock exchange of the listing company.

It is more accurate to use the second formula, since the first day closing price may be high with respect to the offer price only because the whole stock market has risen after the closing date of the subscription.

The existence of the underpricing phenomenon has been well-documented by literature. Several researches and studies examining the underpricing of initial public offerings have been carried out since the early '70s. As reported by Pazarzi (2014), "for the 40-year period between 1969 and 2010 there have been conducted more than 150 empirical studies regarding the underpricing of the IPOs". Reilly (1973) and Ibbotson (1975) were among

the first to analyse this phenomenon; since then, different theories and models have been built to explain the reasons and factors that cause and influence IPO underpricing.

Ritter and Welch (2002), studying a sample of 6,249 US IPOs from 1980 to 2001, found that the average first-day return was 18.8%; Smith (1986), after having summarized the results and studies of other authors, concluded that the average underpricing exceeded 15%. However, the level of underpricing is cyclical; Loughran and Ritter (2004) described that: “in the 1980s, the average first-day return on initial public offerings (IPOs) was 7%. The average first-day return doubled to almost 15% during 1990-1998, before jumping to 65% during the internet bubble years of 1999-2000 and then reverting to 12% during 2001-2003”. Updated results indicate that the average first-day return in a sample of 1,343 U.S. IPO companies was approximately 13 percent from 2001 to 2013 (Ritter, 2014).

The degree of underpricing varies also from country to country; Jenkinson and Ljungqvist (2001) stated that: “the first-day premium that investors experience is positive in virtually every country, and typically averages more than 15 per cent in industrialized countries and around 60 per cent in emerging markets, measured between subscription and the first day of trading”.

Underpricing might have several effects on the newly issued shares and thus on the issuing companies. First of all, from the issuer point of view, underpricing means “Leave money on the table”. Money left on the table is defined as the first-day return multiplied by the number of shares sold. The term comes from the game of Poker where a player, despite having a better hand, is bluffed by the opponent into folding the cards and thereby losing the pot of money on the table. For the issuing firm, leave money on the table means lose

capital that could have been raised for the company if the stock had been offered at a higher price or, alternatively, the same proceeds could have been raised by selling fewer shares, resulting in less dilution of the pre-issue shareholders. Loughran and Ritter (2002) report that, during the period 1990-1998, companies going public in the US have left more than \$27 billion on the table. The \$27 billion amount of money left on the table is twice as large as the \$13 billion fees paid to the investment bankers during the same period. Further, these same companies generated profits of approximately \$8 billion in the year before going public, which means that the amount of money left on the table represents more than three years of aggregate. As stated in Chapter 1, “leaving money on the table” represents a substantial indirect cost to the issuing firms that can’t be ignored. Thus, “leaving money on the table” is an indirect cost for the issuer and, therefore, there must be someone who gains from them up. To find out who benefits from IPO underpricing, it has to be figured out which group of investors (institutional or individual) generally receives the highest portion of allocated shares. As stated in Chapter 1, by getting the highest portion when new shares are allocated, apparently, institutional investors that initially invest into the offered stocks mainly benefit from the underpricing phenomenon.

In addition, underpricing has unpleasant side-effects. The main effect of underpricing is flipping activity. Speculators from both inside and outside the company are highly likely to flip the initial shares. The term flip, describes the immediate selling of shares that have been received before the IPO is made publicly available in the stock market. (R. Aggarwal, 2003; X. Liu & Ritter, 2010). For the initial shareholders of IPOs, a high first-day return (i.e. high underpricing) creates the opportunity to obtain considerable returns in a short

period of time, which incentivizes initial shareholders to flip the shares (DuCharme, Rajgopal, & Sefcik, 2001). Mild flipping activities can increase the trading volume in the secondary market, increase the liquidity of the initial shares, and may even boost the price of the initial shares (Boehmer & Fishe, 2000; Fishe, 2002). However, when flipping activity becomes excessive, there will be more supply than demand of IPO shares in the secondary market (R. Aggarwal, 2003). Additionally, widespread flipping activities are likely to be amplified by an information cascade or herd behavior. In an information cascade, late investors make their decisions based on those of early investors (Bikhchandani, Hirshleifer, & Welch, 1992). Herd behavior describes the phenomenon whereby individuals make decisions according to the decision of the group, regardless of their own information or intentions (Shiller, 1995). Both the information cascade and herd behavior are more likely to occur when there is little available information in the market. Hence, in the case of an IPO, where little historical information can be used as a reference and massive flipping activities combine with an information cascade and herd behavior, the fragile new issues are highly likely to be undermined by the normal price performance occurring in the secondary market.

Despite all these drawbacks, underwriters and issuers don't seem interested in avoiding underpricing. One might ask why this happens. Numerous theoretical explanations have been discussed in several scientific papers and different models have been developed to understand the causes and reasons of this phenomenon.

The theoretical models of underpricing can be based on asymmetric information, institutional reasons, structure of ownership and control or on particular behavior.

2.1.1 Asymmetric information theories

These theories are the most widely accepted among scholars as well as a starting point for many of the theories subsequently formulated. The basic assumption is extremely intuitive: in light of what was said in Chapter 1 concerning the description of the subjects involved in the going public process, substantially summarized in the figure of the issuer, underwriter and investors, what is theorized here is that one counterparties have more information than the other two: an extremely reasonable hypothesis. Asymmetric information-based theories include “Winner’s Curse” theory (Rock, 1986), “Information Revelation” theories (Benveniste and Spindt, 1989; Benveniste and Wilhelm, 1990; Spatt and Srivastava, 1991), “Principal-agent” theories (Baron, 1982; Baron and Holmström, 1980; Loughran and Ritter, 2004) and “Signaling” theory (Allen and Faulhaber, 1989; Grinblatt and Hwang, 1989; Ibbotson, 1975; Welch, 1989).

Winner’s Curse theory

Among the different asymmetric information theories, the best-known model is represented by Rock’s (1986) winner’s curse. This model is based on the assumption that it is possible to categorize investors into “informed” and “uninformed” investors (that, in this context, is different from “sophisticated” and “unsophisticated” classification made in Chapter 1). In addition, it assumes that the underwriter and the issuing firm are not completely informed about the “true value” of the shares: the underwriter and the firm are in informational disadvantage because they must reveal to the market all the information included in the

prospectus, but, they are not able to obtain all the information possessed by informed investors (usually institutional investors). According to Rock (1986), “even though the firm and its agent know more than any single individual in the market, they know less than all the individuals in the market combined. While the investment banker is the one agent suited to price the offering, his information and expertise are inferior to the pooled talents and knowledge of all the agents. Some individuals may have inside information about a competitor that could have a significant impact upon the firm’s product. Others may know better than the firm or the investment banker the appropriate rate to discount the firm’s cash flows in the capital market”. Informed investors, taking advantage of their additional information, apply only for underpriced shares, while uninformed investors are not able to discriminate between underpriced and overpriced shares. Within this context, an informed investor will only bid for those issues that he knows are good, whereas an uninformed investor will bid randomly across all issues, good and bad. Given that a good issue attracts both informed and uninformed bidders, it is likely that the issue will be oversubscribed and as a result all bidders will receive fewer shares than they bid for. When the issue is bad, however, the only bidding will come from the uninformed investors. Given that informed investors do not bid, the issue is not likely to be oversubscribed and as a result the uninformed investor will most likely receive his full allotment. This means that the uninformed investor suffers from the problem of the winner's curse: he receives a small proportion of shares for good IPOs and a large proportion of shares for bad IPOs. Consequently, knowing the winner’s curse phenomenon, the uninformed investors will abstain from participating in the IPO, unless the underwriter and the issuing firm price the share at a discount. If informed demand is not sufficient to absorb all the shares offered,

the participation of uninformed investors becomes essential to the success of the IPO. According to Rock, newly listed firms must be underpriced on average so as to produce an expected return for the uninformed bidder that is high enough to attract investment in IPOs irrespective of whether the issue is good or bad.

Rock's model assumptions and findings have been largely discussed in the literature. Jenkinson and Ljungqvist (2001) questioned the assumption that issuing firms must pay with the underpricing of the shares offered for the uninformed investors' participation in the offering. Indeed, if the number of informed investors is not sufficient to absorb all the offering, the uninformed ones could invest through institutional-informed investors (for example using investment funds) in order to exploit their superior information (in exchange for a fee) and not subscribe overpriced shares.

Hanley and Wilhelm (1995), instead, studying a sample of 38 IPOs managed by a single underwriter, found that approximately 70% of shares of underpriced issues are allocated to institutional investors but also that "institutional investors take similar large position in overpriced offering" and that "institutional investors are allocated large proportion of issues for which pre-offer interest is weak and also of issues for which it is strong" (Hanley and Wilhelm, 1995). These findings can be interpreted as evidence against Rock's model, according to which informed investors impose a winner's curse on uninformed ones by bidding only for underpriced offerings.

In addition, Rock's model assumes that it is costless for informed and institutional investors to abstain from participating in overpriced issues. Nevertheless, Benveniste and Spindt (1989) showed that this choice can cost an investor the opportunity to take part in future

(underpriced) offerings and, consequently, also informed investors decide to participate in less attractive issues. Finally, it is important to take into consideration that Rock's model can be used to explain underpricing only in fixed-price offering, where price is not determined by the bidding of investors. Indeed, winner's curse phenomenon is not a problem in book-building mechanism, because the underwriter solicits investors feedbacks and information prior to the final pricing.

Information revelation theories

Over time, the fixed price mechanism has become obsolete and book-building has become the de-facto mechanism used in pricing shares while conducting an IPO. Thus, Winner's Curse theory leaves room for Information revelation theories. According to Information revelation theories, institutional investors have better knowledge than the issuer and the underwriter about the firm's competitors, the industry and the economy as a whole. Investors are not incentivized to reveal positive information about their own demand for the shares, because this would lead to an increase in the final offer price they have to pay to participate in the IPO. Since the disclosure of information is essential to avoid mispricing, underwriters must find a way to induce investors to truthfully reveal their private information.

Benveniste and Spindt (1989) were the first to introduce "information gathering theory" and they pointed out that book-building could be an appropriate mechanism to induce investors to reveal information about the demand for shares in the pre-selling phase. As described in Chapter 1, investors communicate their interest and submit bids

(communicating the price and the number of shares they are willing to buy) during the road show, before the final price has been set. Book-building process permits the underwriter to reduce the incentive to hide positive information and to better evaluate the offerings. They demonstrate that underwriters acted in order to deliberately underprice the IPO when setting the preliminary price range (result of the dialogue between the issuer and the underwriter), as to induce informed investors to disclose their information truthfully. Investors that truthfully reveal their private (positive) information and their expectations about the value of the listing company must be rewarded by underwriters with discretionary allocation of underpriced shares (book-building mechanism allows investment banks to have total discretion in allocating shares). “If the underwriter is doing his job well, each investor’s reward will just reflect the marginal value of her private information. It follows that underpricing increases in the marginal value of private information” (Jenkinson and Ljungqvist, 2001).

Book-building permits to reduce uncertainty and information asymmetries. Issuers benefit from setting a final offering price higher than underwriter’s initial estimate (upward revision of the initial price range) and, deliberately, “leave some money on the table” because, in the absence of underpricing, investors would not have interest in revealing their positive information.

Cornelli and Goldreich (1999) findings support to “information revelation” theories. They investigated 39 international equity issues conducted using book-building procedure and they found that underwriters allocate large fractions of shares to investors that reveal information in their bids. Specifically, Cornelli and Goldreich (1999) found that “bidders

who reveal information through limit prices are awarded more shares than similar bidders who submit quantity bids without price limits. Similarly, bidders who revise their bids - which can be interpreted as providing information as it arises over time - are subject to more favorable treatment in the allocation of shares”, and that “bidders from the issuer’s country receive a favorable allocation, especially in issues with low oversubscription. Since local investors are typically viewed as better informed, this favorable treatment may be again seen as a remuneration for the revelation of information”.

In addition, Benveniste and Wilhelm (1998) studied the interaction between Rock’s winner’s curse and information revelation. They demonstrated that, when underwriters are able to extract information from well-informed investors using book-building mechanism, both the information asymmetries among investors and between investors and underwriters are reduced. Consequently, it is reduced the winner’s curse problem for uninformed investors and then the level of underpricing.

In contrast with Information Revelation Theories and with Cornelli and Goldreich findings, Jenkinson and Jones (2004), after having analysed 27 European IPOs managed by different underwriters, concluded that there is no evidence that well-informed investors receive larger allocation. They found that underwriters discriminate only between long-term and short-term investors and that long-term shareholders are constantly preferred in allocation. Their “results cast doubt upon the extent of information production during the book-building period” (Jenkinson and Jones, 2004).

Principal-agent theories

Baron (1982) offers an agency-based explanation for underpricing. In his model, the underwriters are assumed to be better informed with regard to the demand for the issuing firm's securities than the issuing firms themselves. The model implies that the more uncertain the issuing firm is about its true market price, the greater the demand for the underwriter's pricing advice. Compensation for this superior knowledge of the market is made by allowing the underwriter to offer the shares at a price below the equilibrium price, thereby reducing the probability of the offer being undersubscribed. Thus, the higher the level of uncertainty, the more problematical is the pricing, and hence the higher is the discount i.e. underpricing. Note that Baron's Agency theory of underpricing is based on information asymmetry, in which the issuer is less informed, but relative to its underwriter and not relative to investors.

Muscarella and Vetsuypens (1989), testing the Baron's model, found that the information asymmetry existing between the issuer and the underwriter is not useful to explain the underpricing phenomenon. They used a small sample of 38 IPOs of investment banks going public without referring to other intermediaries. In other words, they selected a sample of "self-marketed" or "self-underwritten" IPOs, in which investment banks participated in the distributions of their own shares. By doing so, there is no separation between the issuer and the underwriter and, therefore, there is no information asymmetry and there are no principal-agent problems. Muscarella and Vetsuypens showed that, in contrast to Baron's findings, "self-marketed" IPOs present statistically significant underpricing and, above all,

that these IPOs are not less underpriced compared to traditional IPOs.

Signalling theories

Information asymmetry has been identified between investors (in “Winner’s curse” theory), between issuer and underwriter (in “Principal-agent” theories) and between underwriter and investors (in “Information revelation” theories). Lastly, information asymmetry between issuer and investors is utilized by “Signaling theories” to explain why underpricing exists.

Signaling Theory supposes that companies (especially issuing companies’ managers) are the well-informed party and have better information about the firm’s value and future prospects than investors. Underpricing is seen as a signal of firm’s quality and it is used by high quality firms to convince potential investors of their true value.

The original intuition to IPO signalling theory came from Ibbotson (1975), who stated that issuers deliberately underprice to “leave a good taste in investors’ mouths so that future underwritings from the same issuers could be sold at attractive prices”. Other applications of signalling models to explain IPO underpricing were provided by Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989).

Allen and Faulhaber (1989) built a model in which there are only two types of firms: good and bad. The quality of the firm is defined in terms of expected dividend streams. Only firms know the type to which they belong, and issuers are risk-neutral: they want to maximize expected proceeds that are the sum of issuing proceeds from initial public

offerings and subsequent seasoned offerings. Good firms signal their quality through the initial offering price: the level of underpricing is positively linked with the quality of the firm. Allen and Faulhaber (1989) affirmed that “underpricing the firm’s initial offerings (which is an immediate loss to the initial owners) is a credible signal that the firm is good to investors, because only good firms can be expected to recoup this loss after their performance is realized. [...] The owners of bad firms know their expected performance and subsequent market valuation. They know they cannot recoup the initial loss from underpricing, and so cannot afford to signal”.

Grinblatt and Hwang model (1989) is similar to the one proposed by Allen and Faulhaber. In Grinblatt and Hwang model companies’ managers are well-informed about firm’s future cash flow, while investors have little knowledge about project cash flow and their variance. Issuing firms use two different signals: the degree of underpricing and fractional holding (companies use a combination of retained shares and IPO underpricing). They showed that the decision to retain part of the shares issued, is a signal of managers’ optimism about firm’ future prospects. They observed positive relationship between the retention rate and initial returns, and also between the level of underpricing and the value of the firm.

Finally, Welch (1989) built a model in which he assumed that firms are rational actors with superior information operating in a perfectly competitive capital market. The main assumption is that low quality firms must incur high imitation cost to appear to be high quality firms. However, investors may be able to find out the firm’s true quality after the IPO and before seasoned offerings; the cost of underpricing can induce low quality firms to voluntarily reveal their quality. Welch demonstrated that the cost of signaling is lower

for high quality firms and that the degree of underpricing is positively correlated with the firm quality. “The model strongly suggests that IPO firms pursue a multiple issue strategy when they choose both the price and the proportion of the firm they offer at their IPO. The reason why IPO underpricing results in a higher Seasoned offering (SEO) price is an information asymmetry between firm owners and investors. High-quality firm owners can signal their superior information to investors because their marginal cost of underpricing is lower than the marginal cost of underpricing for low-quality firm owners” (Welch, 1989). Empirical studies examining the signalling theory report mixed results. For the U.S., Jegadeesh et al. (1993) test several implications of the signalling models for 1985 IPOs issued from 1980 through 1986. Although some of their results are in line with the predictions of these models, they find, contrary to the signalling theory, that IPO firms are more likely to make a SEO and reissue equity sooner and in larger amounts the higher their aftermarket return. Slovin et al. (1994) analyze the relation between underpricing and the market reaction to a seasoned offering announcement for 175 firms that had an IPO during 1973-1988. Consistent with the predictions of the signalling theory, they find that underpricing mitigates the negative share price response at the SEO. On the contrary, Garfinkel (1993), Michaely and Shaw (1994) and Spiess and Pettway (1997) find that the signalling hypothesis is not an important determinant of IPO underpricing.

2.1.2 Institutional theories

Institutional theories are probably one of the least relevant kind of theories because they are not globally-applicable. In fact, they are not able to explain the phenomenon if the scope of action is extended beyond the borders of the United States and Sweden, nations that have provided the starting point for the formulation of the relative institutional theories.

Institutional theories include “Lawsuit Avoidance” theory (Logue, 1973; Ibbotson, 1975), “Price Stabilization” theories (Rudd, 1993) and “Tax Related” theories (Rydqvist, 1997).

Lawsuit Avoidance theory

The idea behind “Lawsuit Avoidance” theory was first introduced by Logue (1973) and Ibbotson (1975) and it is quite simple: underpricing is used as a mean of insurance against future litigation and possible lawsuits from shareholders. Lawsuits can be time-consuming and very costly to issuing firms, not only directly (costs linked with legal fees or the opportunity costs of management time) but also in terms of reputation costs. Firms going public and their managers have an incentive to insure against these costs: underpricing is deliberately used to reduce the probability of being sued for misstatements or omissions in the prospectus and for bad stock price performance.

Hughes and Takhor (1992) developed a richer model to analyse if “the risk of future litigation can induce an underwriter to purposely sell an initial public offering (IPO) at a discount relative to the value assessed by the underwriter”. They pointed out that there are several circumstances in which litigation risks induce firms and investment banks to

underprice. Nevertheless, they concluded that, even if a link between litigation risk and underpricing exists and can be found in most IPOs, the litigation risk is not the only cause of underpricing phenomenon and they observed that “underpricing occurs even in countries where litigation risk is not a factor” (Hughes and Takhor, 1992)

Price Stabilization theories

Ruud (1993) argues that underpricing is not deliberate, but a result of underwriter intervention in the aftermarket. This theory claims that if the price of the IPO is likely to fall below the offer price, underwriters stabilize the price by bidding on the stock. This price stabilization therefore eliminates the left tail of the initial returns distribution, causing the mean initial return to increase. If it was not for the price stabilization effort of underwriters the mean initial return would be close to zero, that is, there would be no underpricing. Ruud’s (1993) argument is that underpricing typically peaks sharply at zero, but rarely falls below zero. She believes this is due to underwriter intervention. Thus, underpricing is nothing more than an unintentional side-effect of the underwriter’s bidding effort. This controversial theory has received little support from other academics due to the question of why underwriters would engage in price stabilization in the first place. No direct evidence of price support exists and it will not be considered further. Instead, Benveniste et al. (1997) explained how that price-stabilization activity was a tool to reduce underpricing.

Tax related theories

Tax related theories are based on the possibility that IPO underpricing is advantageous in some way regarding taxation. That is, if there are taxation benefits from underpricing an IPO stock, this could be at least a partial reason for why underpricing is observed. Rydqvist (1997) tested the tax explanation of underpricing in Sweden, where employment income used to be more heavily taxed than capital gains. The idea was that by allocating assets that were expected to increase in value to employees, instead of salary, the tax bill could be reduced as capital gains were taxed at a lower rate than employment income. By testing if underpricing changed when Swedish tax authorities changed their system to one of equal taxation of capital gains and employment income, this theory could be tested. When the favorable treatment of capital gains was removed, underpricing in Sweden fell significantly from 41% to 8%. Taranto (2003) had similar arguments regarding the U.S. Unfortunately, other happenings in this period might very well have caused the underpricing decrease, and countries with no changes in tax legislation has also experienced large changes in the level of underpricing from time to time.

2.1.3 Ownership and control theory

Ownership and control explanations of underpricing are based on issuers using underpricing as a tool to strategically select their investors and to allocate company control. The two leading theories within this group are explained below.

Retained control theory

This theory argues that underpricing can be used as a means to retain control of the company after the IPO. Brennan and Franks (1997) argue that underpricing gives managers the possibility to ensure a dispersed shareholder group. By underpricing the stock, additional demand is generated causing single investors to have difficulties in acquiring a large stake in the company. When each investor's stake in the company is small, there is little incentive to monitor the management (Shleifer & Vishny, 1986). By avoiding large owners in the company, managers can protect their own private benefits through underpricing. Brennan and Franks find that large bids are discriminated against compared to small bids. This supports the retaining control argument where issuers avoid large owners.

Booth and Chua (1996) agree with this trend, but offer a different explanation. They argue that the issuers want dispersed shareholders because it increases the liquidity of the shares in the secondary market.

Another way of protecting private benefits of control is to put in place a takeover defense or issue non-voting stock. Field and Karpoff (2002) show that a majority of U.S. firms deploy a takeover defense just before going public. If the management uses other takeover defenses, why would they need to use underpricing to strategically allocate their shares? As there exists proof that other methods of retaining control are used when going public, protection of private benefits is unlikely to be the only driver of underpricing.

Agency costs reduction theory

If the managers have stakes in the issuing company, they might want to work towards reducing agency costs if their agency costs exceed their private benefits of control. Thus, management should seek to minimize the possibility of extracting private benefits, instead of maximizing it (Eckbo, 2008). Based on this intuition, Soughton and Zechner (1998) claim that the management of the issuing company might prefer to allocate shares to large outside investors instead of many small ones, due to the monitoring incentive of a large investor. The large investor could then reduce agency costs through monitoring, but would also reduce the private benefits of control. As long as the manager's agency costs are reduced by more than his private benefits, he has incentive to allocate shares to one large investor. However, the investor needs a good reason to make a large investment in the IPO. He is therefore induced to do so through underpricing. Consequently, underpricing might be a result of managers with ownership, trying to reduce agency costs. This theory has received little attention and there is little empirical evidence supporting it.

2.1.4 Behavioural theories

The last group of explanations for underpricing consists of the behavioral theories. Behavioural theories assert that the underpricing is the result of investors' behavioural biases. The notion is that investors are irrational and bid up the price of IPO shares beyond what they are really worth, or that issuers are irrational and therefore fail to put pressure on underwriters to reduce underpricing.

Cascades

Welch (1992) proposed an explanation of IPO underpricing based on information “cascade” effect. He showed that investors rely completely on the information inferred from previous sales and on the purchasing decision of other investors and thus create information “cascade” by following sequential sales: they tend to ignore their own private information and act like the previous investors. “As a consequence, if a few early investors believe that the offering is overpriced, they can swamp the information held by all other investors and doom the offering to fail. Or, if a few early investors believe that the offering is a bargain, they can create almost unlimited demand for this issue” (Welch, 1992). Book-building discourage this kind of behaviour and Information Cascade Theory can be, in general, applied in fixed-price offerings. Late investors observe whether early investors purchased or abstained from participating in the offerings, so issuing firms need to underprice in order to create high demand from early investors and to start a positive cascade.

Investor sentiment

This behavioral theory argues that the irrationality or sentiment of the investors could have a large impact on the pricing of IPO stocks. The reason why sentiment would play a bigger role in this type of stocks is that IPO firms lack historical data and information, which makes them difficult to value correctly. Ljungqvist, Nanda and Singh (2006) assume that sentiment investors hold overly optimistic beliefs about IPO firms. Issuers would like to take advantage of this, but cannot flood the market with stocks as this would depress the

price. In addition, they cannot hold on to the stocks either, due to regulatory constraints on firms own-stock inventory. Ljungqvist, Nanda and Singh's (2006) theory says that the issuers sell stock to institutional investors, who again resell to the sentiment investors. The institutional investors maintain the supply restricted to keep the price up, and then gradually sell out their stock inventory to the sentiment investors. However, holding the IPO stock over time is risky for the institutional investors. In the event of a stock market downturn, the stock price could drop in value and the institutional investors would be punished for their effort in limiting the stock supply. As a reward for taking on this risk, they receive underpriced shares. This is how Ljungqvist, Nanda and Singh (2006) explain IPO underpricing with investor sentiment.

Dorn (2002) use German data to show that popular IPO stocks pass from institutional investors to retail investors over time. This could support the notion that institutional investors help the issuers limit the supply of their stocks, possibly in order to keep the prices high among the sentiment retail investors.

Sentiment theory could also explain "IPO waves" as the issuers taking advantage of periods with high optimism in the market. Thus, many issuers perform IPOs during hot markets, and few during cold markets. By testing if there is significantly more underpricing during hot markets than cold markets the investor sentiment theory can be tested to some degree. Ritter (1984) findings support that explanation of IPO waves. He finds autocorrelation in monthly average initial returns and in monthly IPO volume: periods of high volume tend to follow periods of high average initial returns.

Da, Engelberg and Gao (2011) tested if higher investor attention affects the level of underpricing in IPO stocks. The most interesting feature of their research is the proxy they use for investor attention, namely the degree to which the company name has been searched for online in Google prior to the IPO. People who search for financial data in Google are likely to be retail investors, as institutional investors would probably have access to better terminals such as Reuters or Bloomberg. Thus, the Google search data relates to the retail investors, which are the ones the investor sentiment theory focus on. Da, Engelberg and Gao (2011) use a measure for Google searches called the Search Value Index which is publicly available from Google Trends. The Search Value Index is then transformed into a measure they refer to as Abnormal Search Value Index, which can be explained as by how much the current week's search index level exceeds the previous 8 weeks' median search value index. They find that company names which experienced a high abnormal search value index from Google Trends in the week of the IPO, had a 6% higher underpricing. In other words, they showed that the higher the attention for a stock in the week before the IPO, the higher the underpricing. Following the reasoning of Da, Engelberg and Gao (2011), the investor sentiment theory can be tested by researching if higher investor attention prior to an IPO gives higher underpricing. Unfortunately, small companies are not always available in Google Trends as their company names are searched for too rarely. This can therefore critically reduce the sample size. Another problem is that some companies have names that could relate to other Google searches like e.g. Apple.

Prospect Theory and mental accounting

Loughran and Ritter (2002) explain IPO underpricing with behavioral biases among the managers of the IPO firm instead of among the investors. The explanation is linked to Thaler's (1980) notion of "mental accounting". Mental accounting implies that the issuing firm only cares about the total wealth gain or loss. Money left on the table due to underpricing is perceived as a loss, while the price appreciation on the shares which the issuer did not sell is perceived as a gain. If the issuer is biased by mental accounting, he sums his wealth loss against his wealth gain. If it ends up in the plus side, the issuer will be overall happy with the performance of his underwriter. Therefore, the underwriters can continue to underprice shares to benefit themselves in various ways. This theory can be tested by investigating whether CEOs are satisfied with their underwriters. This can be proxied by whether or not the firm uses the same underwriter for later, seasoned equity offerings.

Krigman, Shaw, and Womack (2001) studied whether issuers switch underwriters when issuing a seasoned equity offering (SEO) within 3 years after their IPO to measure whether issuers were satisfied with their underwriters after the IPO. Specifically, the results from Krigman et al. (2001) showed that issuers who retained underwriters had a 14.2 percent average first-day return, which was twice that of issuers who changed underwriters, and 15 issuers with 60 percent first-day returns did not switch underwriters. As a result, contrary to what one might assume, the likelihood of retaining an underwriter is positively related to the amount of underpricing. One possible explanation for this phenomenon offered by Krigman et al. (2001) is prospect theory, but other factors might very well be involved.

2.2 Long-run Underperformance

In addition to the short-run underpricing, literature has found a second anomaly in IPOs: the long-run underperformance.

In a similar way as abnormal initial returns, the long-run performance is estimated by computing market adjusted buy and hold return. Long-run underperformance can be computed as:

$$\begin{array}{l} \text{Long-run} \\ \text{underperformance} \\ \text{(or long-run return)} \end{array} = \ln \left(\frac{P_{i,t+k}}{P_{i,t}} \right)$$

where $P_{i,t+k}$ is the price of the stock after the period k from the IPO date and $P_{i,t}$ is the closing price of the stock in the first trading day. For example, if k equal to 3, the formula is calculating the 3 year return of the stock.

Otherwise, as in the case of underpricing, long-run underperformance can be calculated using the market adjusted return, which also takes into consideration the general performance of the stock market in the time lag between the IPO date and the period k .

$$\begin{array}{l} \text{Market-Adjusted Long-} \\ \text{run underperformance} \\ \text{(or Market-Adjusted long-run} \\ \text{return)} \end{array} = \ln \left(\frac{P_{i,t+k}}{P_{i,t}} \right) - \ln \left(\frac{MI_{i,t+k}}{MI_{i,t}} \right)$$

$MI_{i,t+k}$ is the value of the market index after the period k from the IPO date and $MI_{i,t}$ is the value of the index in the first trading day. It should be noted that even underpricing formula can be stated in logarithmical form.

Ritter (1991) was the first to provide evidence of this phenomenon. He analysed 1,526 US IPOs in the 1975-1984 period and found that “in the 3 years after going public these firms significantly underperformed a set of comparable firms matched by size and industry”. Subsequent researches and studies investigated different samples and other markets and confirmed Ritter’s findings.

Loughran and Ritter (1995) enlarged the sample used and the period considered by Ritter in his initial study. They showed that companies issuing stocks significantly underperform, if compared to non-issuing firms, for 5 years after the offering date. “The average annual return during the five years after issuing is only 5 percent for firms conducting IPOs, and only 7 percent for firms conducting SEOs. Investing an equal amount at the same time in a non-issuing firm with approximately the same market capitalization, and holding it for an identical period, would have produced an average compound return of 12 percent per year for IPOs and 15 percent for SEOs” (Loughran and Ritter, 1995). Particularly, they found out that the underperformance is not present in the first six months after the offering date but it is substantial in the next 18 months, while in the sixth and seventh year it is only about 1 percent.

As for the underpricing phenomenon, various reasons and explanations have been given and analysed also for the long-run underperformance.

2.2.1 Heterogeneous expectations theory

The long-run underperformance of IPOs may be the result of investors being overly optimistic or faddish. If a firm's true value is reflected in long-run prices, rather than on the initial trading price, it is possible that IPOs are not initially underpriced, but rather being overvalued by optimistic investors who base their decisions on sentiment or rumors instead on rational analysis of fundamentals. Miller (1977) assumes that investors have heterogeneous expectations regarding the valuations of the IPO firm. The most optimistic investors buy the IPO. Over time, as more information about the true value of the firm become available, the forecasts of both optimistic and pessimistic investors converge. Initial buyer will not be as optimistic anymore. They will then sell their shares. Consequently, the stock price will decrease. Similar arguments are presented by Daniel et al. (1998), who develop a model in which investors are overconfident about their ability to evaluate securities. The conclusion of that paper was in line with those of Miller.

2.2.2 The fads/windows of opportunity theory

According to Ritter (1991) and Rajan and Servaes (1997), long-run underperformance of IPOs is related to investors sentiment explained as “propensity to overpay for the stocks of certain industries at times”. They claim that companies go public when investors are over-optimistic about the growth prospects of the companies. The temporary over-optimism periods about the prospects of IPOs are named as “fads” (first called by Shiller, 1990; Aggarwal and Rivoli, 1990). The IPO market is a good candidate for fads because the

intrinsic value of an IPO firm is hard to estimate, IPO investors may be more speculative and IPOs are difficult to short. Firms recognize market fads and go public when investors sentiment is high and equities are substantially overvalued. Under this windows of opportunity hypothesis, if issuing firms can successfully time their stock issue to coincide with periods in which investors are willing to overpay for their equity, then these IPOs will subsequently produce low long-run returns. Note that in this case is the issuer time decision that generate underperformance in the long run, while in heterogeneous expectation theory underperformance is an investors' overoptimism fault.

Evidence that firms succeed in timing their offerings is mixed. Loughran et al. (1994), find a negative relation between the level of IPO volume and the following year's market return in ten of the 14 countries they analyze. Results in line with this hypothesis are also presented by Lerner (1994). He examines 350 privately held venture capital backed biotechnology firms between 1978 and 1992, and finds that venture capitalists take firms public when equity values are high and rely on private financing when valuations are lower. On the contrary, Ljungqvist (1997) finds that the timing hypothesis cannot explain long-run underperformance for German IPOs.

2.2.3 The window dressing theory

When companies are about to go public they have the incentive to project a favourable picture of their future performance. In addition, the owners have an information advantage in comparison with the investor since they have more or less control over the distribution

of information prior to the IPO. In this context the existence of window dressing, could easily be understood. DeGeorge and Zeckhouser (1993) present evidence of strong incentives for managers to make the company look as good as possible before taking it to the market. Through the use of accounting accruals and cash flow improvement efforts managers have the opportunity to boost reported pre-IPO figures. Issuers can report unusually high earnings by adopting discretionary accounting accrual adjustments that raise reported earnings relative to actual cash flows. If buyers are guided by earnings but are unaware that earnings are inflated by the generous use of accruals, they could pay too much. As information about the firm is revealed by the media, analysts' reports, and subsequent financial statements, investors may recognize that earnings are not maintaining momentum, and the investors may thus lose their optimism. Other things equal, the greater the earnings management at the time of the offering, the larger the ultimate price correction and consequently, greater underperformance of such stocks in the long run. The findings presented in the Teoh, Welch and Wong (1998) article could be interpreted as evidence of earnings management pre-IPO. The authors find that accounting accruals tend to be especially high in the year of the IPO and those companies with the highest accruals are those who perform the worst during the three consequent years. In an earlier study Teoh, Wong and Rao (1993) examine how cash flow and net income varies in the years surrounding the IPO. They found that both cash flow and net income tend to increase the years prior to the IPO and that the levels could not be sustained the years after floatation. As argued by the authors these findings could be interpreted as either evidence of window dressing or that issuers time the IPO after a couple of years of growing cash flows and earnings.

2.2.4 Underwriter price support theory

Apart from explaining part of the high IPO initial returns, the underwriter price support hypothesis may partly explain the long-run underperformance anomaly as well. If first day trading prices are kept artificially high by supportive underwriters, they are the wrong starting point for a long-run performance evaluation because once support is withdrawn, prices will adjust down towards to the true market equilibrium. This implies that offerings which are supported in the aftermarket should have negative returns in the long-run when long-run returns are computed from the beginning of initial trading, but not so when long-run performance is assessed once underwriter support is withdrawn. Conversely, the long-run performance of IPOs not supported in the secondary market should be neutral, irrespective of whether long-run performance is evaluated from the beginning of trading or after price stabilisation is terminated.

2.2.5 Agency costs theory

The operating performance literature has proposed an explanation for long-run underperformance based on Jensen and Meckling's (1979) model of conflict of interest between managers and shareholders. The model suggests that the long-run underperformance is a consequence of increased agency costs in connection to the IPO. When the company, during the floatation, distribute the shares to a large number of investors it might be the case that management's stake in the firm decreases. As their share of equity decreases the incentive to maximize the value of private benefits, rather the value

of the company, increases and hence the increased agency costs. The cost escalation, and hence the long-run underperformance, could be counteracted if managements' equity stake is held constant throughout the IPO process.

Empirically the support for this hypothesis has been slightly positive in US samples and negative in, for example, Japanese samples. It has also been argued that the agency cost model is more applicable in explaining the poor operating performance post-IPO (Jenkinson & Ljungqvist, 2001).

To conclude, the theoretical explanations of long-term underperformance provided by different authors remain speculative in nature and find weak support from empirical evidence. Although researchers have widely documented the abnormal performance of IPO shares both in the few months after the listing and in the long-term, "economist do not yet know what (if anything) causes initial public offerings to perform poorly in the long run" (Jenkinson and Ljungqvist, 2001).

3. Relationships between IPO players

The entire IPO process involves three main parties, namely, issuers, underwriters and investors that not only act separately but also interact with one another in different phases of the process, especially in the stage around the initial date. (Ritter & Welch, 2002).

The goal of this chapter is, on the one hand, to create the concept that each party is not acting alone and, on the other hand, to clarify the structure of interactions among these parties.

3.1 The IPO deal network kernel

Social and economic motivations mutually shape the structure and functioning of IPOs. Much research suggests that, under conditions of market uncertainty, social variables such as familiarity provide useful information to market participants and lubricate exchange processes that could otherwise bog down in claims, counterclaims, and protective maneuvering (e.g., Geertz, 1978; Podolny, 1994; Uzzi, 1997).

Pollock, Porac, Wade (2004) assert that lead underwriters create a “IPO deal network kernel” composed of investors (mainly institutional investors) and other underwriters that participate in the offering. Other actors outside the kernel, such as auditors, venture capitalists, and board members, are also important, but their relationships to the offering firm typically exist prior to retaining the lead underwriter. Although some of these non-

kernel actors may influence the outcomes of an offering independent of the underwriter, they are not directly involved in the construction of the deal network kernel itself.

Prior researches (e.g., Baker, 1984; Carter & Dark, 1993; Carter & Manaster, 1990; Uzzi, 1996, 1999) suggests that four characteristics of deal network kernels are particularly important in shaping IPO outcomes: the proportion of investors who have close and repeated ties to the lead underwriter or syndicate members; the proportion of investors with a long-term investment horizon who are willing to retain a company's stock in the face of short term performance downturns; the heterogeneity of the underwriting syndicate with respect to the syndicate members' social resources in the IPO market; and the size of the network kernel, as defined by the number of investors recruited to participate in the deal.

With respect to network ties, the number of embedded relationships the underwriter has to draw on is an important market-making social resource. Granovetter (1985) suggests that market relationships can vary from those that are instrumental and "arm's length" to those that are "embedded" in dense social interactions that promote trust and cooperation. The degree to which relationships are either embedded or arm's length depends on the frequency (e.g., Baker, 1984; Granovetter, 1985) and concentration (e.g. Larson, 1992; Uzzi, 1996) of past and current transactions between the IPO players. The greater the frequency and the larger the proportion of transactions, the more socially embedded the transactional relationships are. Evidence suggests that embedded relationships decrease opportunistic behavior (Uzzi, 1996), facilitate information transfer (Larson, 1992; Uzzi, 1996), reduce costs (Uzzi, 1999), build trust between the transaction partners (Uzzi, 1997), reduce market volatility (Baker, 1984) and allow investors to get a more favorable allocation (Hanley &

Wilhelm, 1995). More recently, Binay, Gatchev, Pirinsky (2007) find that regular investors also benefit more than casual investors from participating in IPOs. In particular, they find that embedded relationships increase the investors' likelihood of participating in more underpriced IPOs.

Repeated interactions over multiple transactions provide valuable information about a player competence and trustworthiness as a transaction partner (Uzzi, 1996). However, participants in a transaction do not always have prior experience working with one another. A player's reputation can serve as a proxy for prior experience and reduce some of the uncertainties about the transaction (Bromiley, 1993; Fombrun, 1996). If an underwriter has a strong reputation, an investor may be more willing to participate in the IPO and to accept claims the underwriter makes about the quality of the company, even in the absence of previous transaction. Conversely, if an underwriter does not enjoy a strong reputation in the IPO market but does have embedded ties with investors, perhaps through other types of deals, it can draw on these relationships to promote a particular stock.

Even though there are a number of benefits associated with constructing highly embedded deal network kernels, such networks can also make it difficult to gather new information from the environment (Burt, 1992; Uzzi, 1996, 1999). In addition, working exclusively and repeatedly with the same investors increases an underwriter's dependence on those investors and weakens the underwriter's ability to negotiate effectively (Baker, 1990). Thus, the IPO deal network kernel has to include both embedded relationship and arm's length relationship.

As regards long term investors, although some short-term investors are necessary to ensure the liquidity and price appreciation of an offering, placing stock in the hands of long-term investors is a successful strategy for increasing market perceptions of the quality of both the IPO and its underwriter. Long-term investors are valuable and scarce customers, however, and not all underwriters have equal access to them. Underwriters with larger stocks of social resources have greater access to long-term investors, because their prior dealings in the IPO market afford them many opportunities for developing close relationships with such investors. In addition, their generalized positive reputation as underwriters acts as a signal for the long-term viability of an offering (Pollock, Porac, Wade, 2004). Note that short term investors as well as long term investors are needed to generate market liquidity. The lead underwriter has to come up with an optimal mix of short term and long term investors.

Establishing relationships with varied investors takes time and resources and, however, even the most reputable and largest banks do not have complete coverage of the market. This makes underwriting syndicates useful in constructing the deal network kernel. Different kinds of investment banks have different portfolios of clients, and by including a range of investment banks in a deal kernel, the lead underwriter can adjust the characteristics of the kernel in ways appropriate for a given deal (Pollock, Porac, Wade, 2004). In other words, the greater the social resources of the lead underwriter, the greater the social resource heterogeneity of the underwriting syndicate.

An underwriter's dependence on the IPO market also impacts the IPO deal network kernel design. Greater or lesser dependence on a particular resource in a bank's task environment

has important implications for how the bank manages those resources (Baker, 1990). To the extent that a bank is financially dependent on the IPO market, it will be more sensitive to conditions that could cause long-term damage to the integrity of the offering process i.e. in constructing their IPO deal network kernels. It is to the dependent bank's advantage to have greater variety in the types of relationships composing its IPO deal networks and to be more aggressive in recruiting new institutional investors into its deals, even though doing so increases the risk that arm's length investors will act opportunistically. Rowley, Behrens, and Krackhardt (2000) suggests that dependent underwriters who feel greater pressure to engage in exploration for new network resources include a greater proportion of arm's length ties in their deal networks than less dependent underwriters, who are content to make use of their current network resources. In order to minimize the risks associated with having a higher proportion of arm's length ties in the deal network, dependent underwriters also construct larger deal networks in terms of both investors and syndicate members so that they reduce their exposure to opportunistic behavior of each player (Baker, 1990).

By deploying social resources to adjust the mix of participants in the offer, the underwriter exerts a certain control over transaction outcomes. Greater social resources afford the underwriter more choices in recruiting deal participants and, thus, assist the underwriter in striking appropriate tradeoffs among participant objectives. For example, the presence of embedded investors in an offer is positively related with underpricing (Binay, Gatchev, Pirinsky, 2007) and, as stated in Chapter 2, the higher the underpricing, the higher money left on the table that is detrimental for the issuing firm. When taken to the extreme, social

resources can induce the underwriter to lose bargaining objectivity and to favor some market participants over others. Collusive behaviors markets sometimes occur outside of accepted practices and can be detrimental to the integrity of the market as a whole. Such collusion is the "dark side" of embedded social relationships and it is caused by an upstream problem: the conflict of interest.

3.2 Conflicts of interest in IPOs

This subchapter analyses the main conflicts of interest that can be established between the subjects participating in the IPO process.

First of all, conflict of interest should be defined. The definition of conflict of interest itself has attracted a lot of academic attention.

According to Boatright (2000) conflict of interest exists “when a personal or institutional interest interferes with the ability of an individual or institution to act in the interest of another party, when the individual or institution has an ethical or legal obligation to act in that other party’s interest”. Mehran and Stulz (2007) define conflict of interest “....as a situation in which a party to a transaction can potentially gain by taking actions that adversely affect its counterparty”.

The categories of subjects to be taken into consideration in this chapter will be those discussed in the previous chapters and, in particular:

- The shareholders of the issuing company. It's important to distinguish between the shareholders participating in the offer by selling their own stocks and those which, instead, keep their own shares or the majority of them in their portfolio;
- The Underwriter. Particular attention is paid to the case in which the underwriter is one of the banks that finance the company. This category included also the underwriters' analysts.
- Investors
- Venture capitalists in the case in which social structure has capitals that are part of a fund and, therefore, defend their interests.

Conflicts of Interest between underwriters and issuing firms

3.2.1 Laddering

One source of conflicts of interest for investment banks is laddering. Laddering refers to the effort of the investment banks to motivate clients to buy IPO shares in the first days of trading by promising preferential treatment in share allocation of the current IPO or future IPOs in order to make the IPO a bigger success (Rethal and Palazzo, 2007). Increased demand in the aftermarket increases the degree of underpricing and conveys the message of the IPO being a huge success leading to increased reputation of the underwriters involved. The investors who enter into such agreements with the underwriter are called

ladderers. A number of major investment bankers have settled cases with SEC in the United States in which laddering allegedly occurred (J.P. Morgan, Morgan Stanley, and Goldman Sachs agreed to pay \$25 million, \$40 million, and \$40 million respectively, to settle accusations of laddering).

Hao (2007) presents a theoretical model of laddering and its implications in initial returns, long term performance and allocations of IPOs. The paper posits that laddering increases the offer price, the aftermarket price and the amount of money left in the table. The greater money on the table is because the aftermarket price is inflated more than the offer price is. As a result of the increase in short term returns, laddering contributes to a negative relationship between long term and short term performance. Finally, when the underwriters collude with the investors in rent seeking behaviour in underpriced IPOs, laddering provides additional value to the underwriters. The empirical implications as pointed out in this paper do signal that laddering involves conflicts of interest on the part of the underwriter. Although on some occasions laddering may lead to improved offer prices, there are several other issues that are harmful for the issuers, not least the negative correlation between initial and long term returns which could be very much detrimental to the issuer if it plans to come back to the capital market sometime in the future.

While Hao (2007) presents theoretical framework for explaining laddering, Griffin et al., (2007) provide empirical support. The paper uses a sample of 1,294 IPOs listed on the Nasdaq during the period 1997-2002 and merges it with the Nasdaq clearing data for the first 21 days of trading for each IPO. The paper explores the net purchase trading behaviour of bookrunner's (lead underwriter) investor client immediately after the IPO. They find that

during the period 1997-2002, book runner client bought an amount equal to 20.64% of the shares issued while they sold only 11.85% and thus creating a net buy imbalance of 8.79%. They propose four different hypotheses to explain such behaviour: (a) demand from long term investors (long-term shareholders); (b) superior execution quality of the bookrunner (execution quality), (c) clients of bookrunner have strong demand for IPO share (clientele), and (d) laddering by investors (laddering). The paper also investigates the impact of this trading behaviour on the IPO prices. Both the univariate and multi-variate results favour laddering hypothesis over the others.

Hao (2007) shows laddering does have a number of negative impact on the efficiency of the capital markets and/or on issuers and therefore has to be investigated and evidence brought to light. Whatever little evidence is available points to the fact that laddering might be used by investment banks to their own benefit at the expense of issuers. This can at least be said of the US during the internet bubble period. However, a number of issues remain outstanding. While there remains no doubt of the impact of laddering on underpricing, the impact of laddering on long term performance can at best be considered ambiguous.

3.2.2 Spinning

Spinning refers to the practice of allocating hot IPOs by underwriters to managers and executives of the issuing firms or to other influential clients in order to get their future IPO deals. Spinning is done to influence the decision of the issuers in their choice of the lead underwriter and/or the pricing of their initial public offerings (Liu and Ritter, 2007). Liu

and Ritter (2007) regard it as a form of bribery paid by investment banks to the top executives of its clients. The first use of spinning as an explanation for IPO underpricing was by Loughran and Ritter (2004). Using comprehensive data from 1980-2003 comprising of 6,391 IPOs, the paper examines why underpricing changed over time and evaluates three non-mutually exclusive hypotheses: the changing risk composition, realignment of interest and changing issuer objective (incorporating the analyst lust and spinning hypothesis). In this very highly cited paper the authors introduce “spinning and analyst lust” hypothesis to explain the very high initial returns observed during the internet bubble period. The hypothesis predicts that IPOs underwritten by top-tier underwriters to be more underpriced because of the need of the issuers of having high ranked analyst and also because of the ability of these underwriters to allocate hot IPOs (spinning) to executive and decision makers of the issuing firms. Using reputation of the underwriter as a proxy for changing issuer objective hypothesis, the authors find that top-tier underwriters are associated with more underpricing, especially during the internet bubble period. The authors argue that this exhibits the desire of the decision makers of the issuing firms to put up with higher underpricing because of the side payments and the positive analyst coverage received. While Loughran & Ritter (2004) provide indirect measure of spinning, Liu and Ritter (2007) provide first clear evidence of spinning by investment banks and its effect on the level of underpricing and on future investment banking mandates. Using actual spinning data of 56 IPOs brought to the market by three investment banks (Credit Suisse First Boston, Dutch Morgan Grenfell, and Salomon Smith Barney) during the period 1996-2000 the authors find initial returns of IPOs in which the executives were spun almost 18% higher than other IPOs. They also find that spinning to be negatively related to the

probability of switching underwriters between the IPO and the first SEO. 31% of the issuers switched underwriters when there was no case of spinning, while only 5% of the issuers switched underwriters whose executives were being spun. These results bring to light the effect of spinning. It proved beneficial to the underwriters and the decision makers of the issuing firms. The original shareholders of the firm are, however, at loss because of lower IPO proceeds and dilution of the value of their holdings.

3.2.3 Profit Sharing Allocation

Number of academic studies have argued that book-runners make preferential allocations to investors with whom they do brokering business (Reuter, 2006; Jenkinson and Jones, 2009). If there is a link between IPO allocations and broking business, this could mean that book-runners profit from IPOs, not only through IPO fees, but through the extra brokering commissions generated from investors favoured in IPO allocations.

A central question is whether underwriters use their discretion over IPO allocations to reward investors either institutional or individual for directing brokerage business to their investment banks. This question highlights a potential conflict of interest between underwriters and issuers. To the extent that underwriters are able to use shares in underpriced IPOs to earn inflated brokerage commissions or attract additional investment banking business, they have an incentive to set offer prices below the levels that maximize proceeds for issuers (e.g. Baron, 1979; Loughran and Ritter, 2002).

Reuter (2006) provides evidence of quid pro quo relationships between underwriters and issuers. The paper uses brokerage and IPO data during the period of 1996-1999 involving 142 unique investment banks, 1868 IPOs and 21,912 N-SAR reports. Combining brokerage commission data with holdings of mutual funds, the paper finds strong correlation between brokerage commission paid and the holding of IPOs by mutual funds. Results also show that the mutual funds are the greater beneficiaries of underpricing as the paper estimates that as much as 20.9 billion out of the 50.4 billion left on the table during the four years was received by the mutual funds.

Similar observations were echoed from the results of a paper by Jenkinson and Jones, (2007). The paper uses survey method to identify the role of investors in the underwriting process. There are 57 respondents from 49 investing firms, 42 mutual fund manager, 8 chief investment officers, 5 analysts, and 2 dealers. All but 10 of the respondents are based in UK. Thus the paper more or less reflects the investor's attitude in the UK. The most interesting finding of this paper is that investors view the single most influential determinant of a good IPO allocation to be the extent of broking business with the bookrunner.

The final paper to be reviewed in this section is a working paper by Goldstein et al. (2011). The paper presents some interesting empirical evidence on IPO allocation and brokerage commissions. It sets up an interaction between short term and long term investors in terms of IPO allocation and the factors that determines allocation among these two groups of investors. The paper also examines the modes of brokerage payments made to underwriters by investors to get preferential allocation of IPOs. Set during the hot IPOs market of late

1990s, the paper finds empirical evidence of incremental brokerage payments in the case of hot IPOs. The paper estimates that approximately \$1.7 million of additional commission per IPO was received by the lead underwriter in the 10 day period immediately preceding the most profitable IPOs. The payment of this additional brokerage commissions is, however, negatively related to the concentration of underwriter's client base i.e. the larger the long term investors of the underwriter the lower is the incremental commission received by the underwriter and vice-versa. Results also indicate that the long term and short term investors interact differently with the lead underwriter to receive allocations of hot IPOs. While the long term investors use their consistent payment of brokerage commissions over a period of time as the tool for IPO allocations, short term investors direct incremental commissions prior to IPO allocation to receive preferential treatment. Results also show that significant part of the money left on the table from underpriced IPOs is captured by investors, both long term as well as short term investors.

Review of the papers above does provide enough ground for suspicion that investment banks might be involved in quid pro quo relationships with the investors. Reuter (2006) and Goldstein et al. (2011) provide evidence of the same. However, it must be noted that both the studies utilized proxies rather than actual allocation data. Through the use of survey, Jenkinson and Jones (2007) show that it could be a global phenomenon and not just exclusive to the US. Apart from this survey there is no evidence of profit sharing allocation from United Kingdom, continental Europe or emerging markets. Another point worth noting is the data period of these studies. The studies have utilized data until the end of the bubble period and there is no evidence on the behaviour of the investment banks post 2000.

Conflicts of Interest between underwriter and investors

3.2.4 Relationship Banking

There are two types of banking relationship that has to be investigated in the context of IPOs. One looks at pre-IPO commercial banks affiliations with investment bank and the second explores the relationships of venture capital funds affiliated to investment banks. Both of the relationships are quite similar in the sense that these relationships can be exploited by the issuing investment banks to pursue its own objectives at the expense of the issuer.

Pre-IPO Commercial Bank Relationships

Klein and Zoeller (2001) investigate the concept of "universal banking" and how it relates to situations in which the interests of the underwriter are in conflict with those of the investors. Universal banking refers to all those financial institutions that have close relationships with the businesses of the companies to which they provide typical services of both commercial banks and investment banks. The universal banking benefit from economies of scope and scale between the different financial services that it provides. On the other hand, conflict of interest can arise. Moreover, financial intermediaries can be too susceptible to changes in business performance of the companies to which they provide different kind of services because of their close connection with the businesses in question.

The 1933 Glass-Steagall Act addressed the potential conflict of interest by banning commercial banks from the market for corporate securities underwriting (Sections 20 and 32 of the Act). The deregulation process begun in 1987 when regulators reinterpreted Section 20 of the Glass-Steagall Act and allowed some banks, such as JP Morgan and Bankers Trust, to set up Section 20 subsidiaries which can underwrite corporate securities (Puri, 1999). This process culminated in the 1999 Gramm-Leach-Bliley Financial Modernization Act, which brought down the 'firewalls' that limited information, resource, and financial linkages between Section 20 subsidiaries and their parent holding companies as well as with their commercial banking affiliates.

Motivated by these policy developments different studies have investigated the conflict of interest and consequences of bringing down the commercial-investment bank firewalls.

There are two theories concerning the conflict of interest of universal banks (commercial and investment) in the role of underwriters and, at the same time, lenders of the issuing firm. These two theories reflect two alternative points of view on how the intermediary can use of the information he gathers from the lender role of the issuing firm. The first theory (the so-called "certification" theory), states that relationship banks that manage their clients' IPOs use their proprietary firm-specific information to price these stocks more accurately than an uninformed bank with no ties to the firm. Further, relationship banks have an incentive to avoid the underwriting of low-value clients, which are typically higher-risk IPOs that could expose the bank to a conflict of interest. This selection mechanism is reinforced because high-value firms also have an incentive to go public with their bank, which is in a position to certify the high value of their stock. In contrast, low-value firms

are indifferent between staying with their bank (which would only take them public at a low price) or switching to an outside underwriter (which would infer the firm is low value and therefore would place it at a low price). In this case the bank uses its information to reveal the true value of the issuing firm and, therefore, favor potential investors and a fair market. The conflict-of-interest theory, otherwise, states that relationship banks that manage their clients' IPOs use their proprietary firm-specific information to fool the public into buying overpriced securities. Further, banks do not shy away from underwriting the IPOs of their low-value firms. There is no selection in the firm-underwriter match, nor any difference in the valuations of IPOs underwritten by their bank and stocks taken public by independent banks (Benzoni and Schenone, 2010).

Benzoni and Schenone (2010) and Schenone (2005) support the first theory. They assert that relationship banks avoid potential conflicts of interest by choosing to underwrite their best clients' IPOs. Rational investors anticipate the bank's reaction and value issues underwritten by the pre-IPO lender higher than IPOs managed by independent banks. The market is not fooled. Over the long run, IPOs managed by relationship banks do not underperform similar issues managed by outside banks. In sum, their findings indicate that in this respect the effect of the 1999 repeal of Sections 20 and 32 of the Glass-Steagall Act has not been negative.

Further support to certification is given by Hebb (2002), that examines the initial performance of 431 industrial IPOs issued in the US during the period Jan 1995-Dec 1998. The sample consists of 222 IPOs issued by commercial banks and 209 by independent investment banks. The main objective of the paper is to examine whether commercial bank

underwritten IPOs have lower underpricing compared to investment bank underwritten ones. Results show that IPOs in which one of the underwriters had a previous banking relationship with the firm have significantly less underpricing supporting the certification hypothesis. Results are similar when only commercial bank lead underwriters are used providing further support to the hypothesis. The authors argue that the relaxation of the firewalls seem to have been interpreted by the market as allowing more information flow from the commercial bank to its underwriting subsidiary and therefore beneficial to the investors, contrary to the conflict of interest hypothesis.

To conclude, most of the papers that have explored universal banking in the context of pre-IPO banking relationship support the certification hypothesis which posits that information asymmetry decreases as commercial banks certify the issues.

Venture Capital Relationships

The venture capital industry offers a testing ground for the importance of conflict of interest in the issuance of public securities. Most venture funds are run by independent firms that have no affiliation with another institution or organization. Others, however, have relationships with financial institutions or corporations.

Venture capital industry can be divided into those venture capital firms that are independent and those that are either captive subsidiaries of or are affiliated with an investment bank. This classification allows to determine whether the market treats affiliated offerings differently from unaffiliated offerings. The investment banks affiliation with venture capital are analogous to universal banks in many respects. First, an investment bank that is

underwriting a security for a company in which it holds a venture capital investment will have substantial private information on the company: venture capitalists sit on boards and advise managers. If the investment bank has private information about the firm, it may attempt to time security market issues that increase the value of its existing investment. If it is selling a large fraction of their stake at the time of the IPO, the venture group will receive cash for its shares at a very attractive price. The investment banks that have venture capital subsidiaries suffer from potential conflicts of interest similar to those associated with universal banks, especially in valuing the IPOs. On the one hand, an investment bank acts as an agent for the firm issuing securities in an initial public offering. As an agent, the investment bank has an incentive to declare a high price and raise as much money as possible for the company. In addition, its fee is based on the size of the offering. On the other hand, the investment bank is concerned about losing its ability to place shares in future offerings if it develops a reputation for pricing offerings too high (i.e. have low underpricing). The investment bank also has long-term clients on the purchasing side (for example, large mutual and pension funds) that provide substantial amounts of business for the bank. The investment bank does not want these clients to be hurt by offering the issue at excessively high price. These concerns will limit how high the investment banker will set the price of any particular offering. When an investment bank is also an investor in the firm, the ability to directly gain by selling overpriced shares (either at the time of the offering or shortly thereafter) may provide an additional incentive to sell equity at a higher price. What happens both at the time of issuance and in the long run depends upon the market conditions that prevail. Kroszner and Rajan (1994) propose two hypotheses concerning conflicts of interest and market performance.

In the “naive investor” hypothesis, investors do not take these conflicts into account when assessing offerings. Consequently, an investment bank has an incentive to charge a high price when it holds an equity stake. The issues taken public by an investment bank that has invested in the company should perform significantly worse in the long run. The poor performance should be manifested in lower stock returns and higher liquidation rates. Under the second hypothesis, “rational discounting,” the market correctly anticipates that underwriters who hold an investment interest will be subject to potential conflicts of interest. The market may choose not to purchase issues that are difficult to evaluate if there is a conflict. Therefore, underwriters that are also venture investors should not be too optimistic in setting the offer price. If the market correctly anticipates the conflict of interest, then there should be no difference in long-run performance between issues brought public by an independent underwriter and those brought public by an investment bank that holds an investment in the company.

The two hypotheses also have different predictions about the first-day return, that is, underpricing. In many models of the IPO process, offerings are sold at a discount to initial investors in equilibrium. Investors are concerned that they will be allocated more shares of poor offerings than shares of good offerings if others know things about the firm that they do not. In the naive investor hypothesis, investors do not differentiate between issues by independent investment banks and those that have a conflict. Thus, underpricing will be the same. In the rational discounting hypothesis, the presence of a conflict implies that issues through investment banks that are investors should be more underpriced.

Gompers and Lerner (1999) investigate if the market anticipates such conflicts of interest by observing market reactions. Their evidence strongly supports the rational discounting hypothesis, while rejecting the naive investor hypothesis. The sample consists of 856 IPOs which are backed by a venture capital fund over the period 1972-1992. Venture capital funds in 386 out of the 856 IPOs are affiliated to an investment bank and 127 of them are actually brought to the market by the affiliated lead or co-manager. Results show that IPOs in which underwriter hold prior venture investments perform no worse and may actually perform better (with some performance measures) in the long run than other IPOs. This means that actual or potential conflicts of interest do not have any impact on the long run performance of IPOs. Also initial returns support the rational discounting hypothesis as the degree of underpricing for such IPOs were much higher compared to IPOs which didn't have underwriter affiliated venture capital funds. The authors refer to this result to argue for universal banking as market participants understand potential problem and adjust accordingly.

Using UK data over the period 1992-1995 Espenlaub et al. (1999) conduct a similar study. The study examines whether there is conflict of interest or certification where investment houses are affiliated to VC backed IPOs. Similar to the results of Gompers and Lerner (1999), initial returns of IPOs backed by underwriter affiliated VC is much higher than the IPOs backed by independent VCs. This can also be interpreted as investors requiring greater discount in the light of potential conflict of interest.

Hamao et al. (2000) and Bessler and Kurth (2007) studies, from respectively Japan and German, are also the mirror of those conducted by Gompers and Lerner (1999).

To conclude, conflict of interest is found to have profound impact on the degree of underpricing while no such impact is found on the long term returns. Most of the papers also have reputation as a key explanatory variable. Reputation of both underwriters as well as venture capitalist has a big impact on the performance of IPOs, especially in the long term. IPOs which have prestigious underwriter/venture capitalist perform much better than those without such affiliations in the long term.

3.2.5 Allocations to Affiliated Funds

Numerous investment banking groups operate through mutual funds. If these mutual funds, in turn, are investors of IPOs managed by their investment banking arm, potential conflict of interest can arise. With large amount of money left on the table coupled with the reputation of the investment bank at stake, managers of affiliated mutual funds could be under pressure to buy IPOs underwritten by their investment banking arm (Dietz and Henkoff, 2004). In this scenario, the investment banking group has three factors to consider (Ritter and Zhang, 2007):

- a) The underwriting spread: the underwriting fee would lead the investment bank to allocate shares of weak IPO to its affiliated funds.
- b) Commission paybacks: In case of hot/underpriced IPOs, allocating them to unaffiliated funds would result in profit sharing through directed commissions (as discussed above).
- c) Fund performance: Investment banks can improve the performance of affiliated mutual funds by allocating them hot IPOs and therefore attract money in those funds.

The first two factors will generally lead the investment bank to allocate only cold IPOs to affiliated funds while the third factor makes the investment bank act otherwise. It is the balance between and interplay of these three factors that ultimately decides the allocation of IPOs to affiliated funds. Ritter and Zhang (2007) present two alternative hypotheses explaining the allocation of IPOs to affiliated funds:

- a) Nepotism hypothesis: It refers to the situation whereby underpriced IPOs are allocated to affiliated funds. The purpose is to improve the performance of the funds, attract money inflows and subsequently earn higher management fees.
- b) Dumping hypothesis: it refers to the situation whereby investment banks allocate cold IPOs to their affiliated mutual funds in order to support weak aftermarket demand so as to maintain and enhance their underwriting business.

It is not necessary that a particular investment bank always follows a particular course of action; one hypothesis might be preferred at a particular time, while at some other time a different course of action might be undertaken. The course of action will be influenced by the market condition. In cold IPO markets dumping hypothesis and in hot IPO markets nepotism hypothesis markets might be more prevalent. Ritter and Zhang (2007), paraphrasing Karceski (2002), state that “underwriter would allocate more hot IPOs to its affiliated funds when the overall expected first day return of IPOs is high and attracting money inflows for the affiliated funds is most important, because of the greater performance-funds flow sensitivity that exists in bull markets.”

The first paper to systematically explore allocations by investment banks to affiliated funds is Ber et al., (2001). Using a sample of 120 Israeli IPOs issued during 1991- 1994 the paper addresses potential conflicts of interest when investment bank group also manage mutual funds. The study utilizes both the short term underpricing and long-run operating performance measures to examine conflicts of interest. On the basis of post issue accounting returns, the paper presents no evidence of any conflict of interest when there is an affiliation between mutual funds to which the issue is allocated by managing underwriter. Results show that there are potential conflicts of interest when the lending, underwriting and mutual fund management all fall under one roof. Although the number of IPOs in this group is fairly small (only seven IPOs in this case), it seems that mutual funds managed by the investment bank pay high price for the IPOs managed by the affiliated investment bank at the expense of mutual fund investor.

Ritter and Zhang (2007) present empirical evidence of allocation of IPOs by investment banks to affiliated mutual funds. Their sample consists of 2,257 IPOs issued during the period 1990-2001 by investment banks which had affiliated mutual funds. Out of the 2,257 IPOs, 283 of them were allocated to affiliated mutual funds. The primary issue that the paper tackles is whether affiliated mutual funds are used by investment banks as a place to dump cold IPOs (at the expense of the large number of mutual funds shareholders) or are they allocated hot IPOs so as to boost fund performance and thereby extract larger management fees. The paper notes a steady increase in the allocation of IPOs to affiliated mutual funds. While less than 10% IPOs were allocated to affiliated mutual funds during 1990-1996, approximately 30% of the IPOs were allocated to affiliated funds in 1999-2001.

In univariate results, the average initial returns of IPOs which are allocated to affiliated mutual funds is 54.4%, almost 29% above the average initial return of 25.8% of other IPOs from those underwriters which have affiliated mutual funds but didn't allocate IPOs to them. Thus the univariate comparisons seem to support the nepotism hypothesis. In multivariate results, the nepotism hypothesis is not so convincing. Only for the period 1999-2000 the initial returns of IPOs allocated to affiliated funds is statistically significant and higher than of IPOs which are not allocated. For all other sub-periods the results are statistically insignificant. The paper finds some evidence of dumping hypothesis when analysing only IPOs which were involved in large allocations to affiliated mutual funds. Initial returns are 12% lower when a large allocation is made to affiliated mutual funds during the period 1995- 1996. Similarly, during 1990-1994 initial returns are 10% lower for IPOs which have a large allocation to affiliated mutual funds.

Reuter's (2006) paper which has already been introduced in the profit sharing allocation section also address the issue of allocation to affiliated mutual funds. In his statistical test the coefficient on the affiliated mutual funds dummy is not significantly different from zero indicating such funds neither received disproportionately larger or fewer IPO allocation compared to other funds. With respect to brokerage commission and IPO allocation, the coefficient on the affiliated mutual fund is negative and statistically significant which means that the affiliated funds earn slightly lower first day returns on IPOs than the level of their brokerage commission payments to the affiliated underwriter would predict. This would mean that underwriter neither dump nor favour affiliated mutual funds.

To conclude, with the repeal of the Glass-Steagal act of 1933, the debate over universal banking has intensified. With investment banks becoming even more powerful coupled with huge funds available to mutual funds and other institutional investors, the regulators and the investor community is interested to see whether the interest of the small investors are protected by these large and powerful players in financial markets.

3.2.6 Affiliated Analysts

Usually, investors utilize earnings forecasts and stock recommendations of financial analysts to make informed investment decisions. Accordingly, investors expect that analysts provide to the best of their knowledge objective, unbiased and accurate equity research. The management of the covered firm, however, is not always interested in an objective and accurate research report, but most likely in a positive research outcome.

Financial analysts are always confronted with a fundamental dilemma. On the one hand, they have an incentive to establish a good relationship with the firm's management in order to gain privileged access to important information (Lim, 2001; Francis et al., 1993). This information advantage could result in superior earnings forecasts and stock recommendations, which should improve his reputation from the perspective of the investor. On the other hand, a precise and objective research report can create problems if the company does not agree with the report, or the outcome of the research is not in the interest of the firm. Consequently, the management of the company can deny the analyst access to further information.

A particular problem arises when the employer of the analyst is an investment bank or a broker that also offers corporate finance services. These affiliated financial analysts have a strong incentive to come up with positive research reports that are distributed to the existing and potential customers in order to generate additional business for the investment banking division. Dechow et al. (2000) and Lin and McNichols (1998) find empirical evidence for this conflict of interests. Their research conclude that affiliated analysts publish more optimistic forecasts and stock recommendations than unaffiliated analysts. O'Brian et al. (2005) confirm the unwillingness of affiliated analysts to distribute negative research reports in order to secure investment banking mandates and to minimize potential conflicts between the commercial and investment banking divisions and the management of the client firm. They also observe that affiliated analysts have the tendency to publish buy recommendations sooner and more often than unaffiliated analysts after a company has issued securities. In addition, these analysts upgrade the stock recommendations of the covered firms faster, whereas downgrades are more delayed compared to those of unaffiliated analysts. Nevertheless, the special relationship of the analysts to the investment banking or corporate finance divisions of their employer, which is the reason for these conflicts of interest, may also produce certain advantages. The analysts of the underwriter, for example, may possibly have superior information about the company which were obtained during an IPO (or an SEO) for which the investment banking division acted as an underwriter (Michaely and Womack, 1999). This information advantage should usually result in a higher research quality of the affiliated analysts compared to the unaffiliated analysts.

Clarke et al. (2004) don't confirm the hypothesis of conflict of interest mentioned above. They find less optimistic and more accurate forecasts for the analysts of large investment banks compared to independent analysts. Thus, it is possible that larger institutions offer analysts better resources (Clement, 1999), which then result in a higher research quality. It is also mentioned that larger banks are more attractive for better analysts than smaller independent research institutions, because the analysts may easier increase their reputation and receive a higher compensation (Hong and Kubik, 2003).

During the more recent years, the conflicts of interest of financial analysts have been at the center of public debate and investigation. The pressure that the investment banking division or the CEO exerted on analysts, the publication of misleading research, the consulting services of analysts to the management of covered firms, and finally the discover of several illegal analyst and investment banking activities lead to massive critique regarding the quality and objectivity of the financial analysts' profession. The result is a vast number of new legal rules and regulations (e.g. FINRA Rule 2241).

4. Regular investors role on underpricing

In this final Chapter, underpricing and IPO relationships will be jointly investigated in order to determine whether the first is related to the participation of regular investors who repeatedly invest in IPOs conducted by the same underwriter.

Benveniste and Spindt (1989) suggest firms to hire an underwriter instead of conduct the public offer on its own, because underwriter can reduce underpricing by selling IPOs repeatedly to the same regular investors. They assert that “An underwriter provides regular investors with fairly significant profits by including them in his list of regulars. These profits can be used occasionally to induce investors to take a badly received IPO off the underwriter’s hands. Informally, the underwriter holds out the threat that if an investor refuses to purchase the issue at hand, he will be blackballed in future allocations and thus be denied the profits accruing to regular investors in IPOs”. So, we expect a negative relationship between underpricing and regular investor participation.

The rest of the Chapter is organized as follows: subchapter 4.1 discusses data, subchapter 4.2 discusses methods, subchapter 4.3 provides the results and subchapter 4.4 draws the conclusions.

4.1 Data and Sample Characteristics

The full sample is collected from the Thomson One Deals database (TOD). It consists of 1,677 US IPOs occurring on the NASDAQ and NYSE from January 2000 to December 2016. Following the IPO literature, we exclude stock with an offer price below \$5, non-common shares, closed-end funds, filings by foreign-domiciled firms, Master Limited Partnerships (MLPs), American Depository Receipts (ADRs), and Real Estate Investment Trusts (REITs). To measure institutional investor-underwriter relationships, we collected the name of lead managers from the TOD and the data about institutional investors' participation in 13F institutional ownership. We use the first reported holding by an institutional investor at the end of the offering quarter as proxy for the initial allocation that the institutional investor received. Actual allocations are not publicly available so many of the previous studies use the reported holdings in the first quarter after the IPO to proxy for initial allocations (Reuter, 2006; Ritter and Zhang, 2007; Field and Lowry, 2009; Goyal and Tam, 2009). Accounting data came from Compustat and other information regarding the market conditions and the US underwriters' reputations is gathered from Jay Ritter's website. The final sample includes 551 US IPOs, due to missing values on the variables of interest.

4.1.1 Summary statistics

Table 1 reports summary statistics for the 551 IPOs final sample. The average number of past relationships is measured by “avgann” and “avgbi”: the first concerns the average

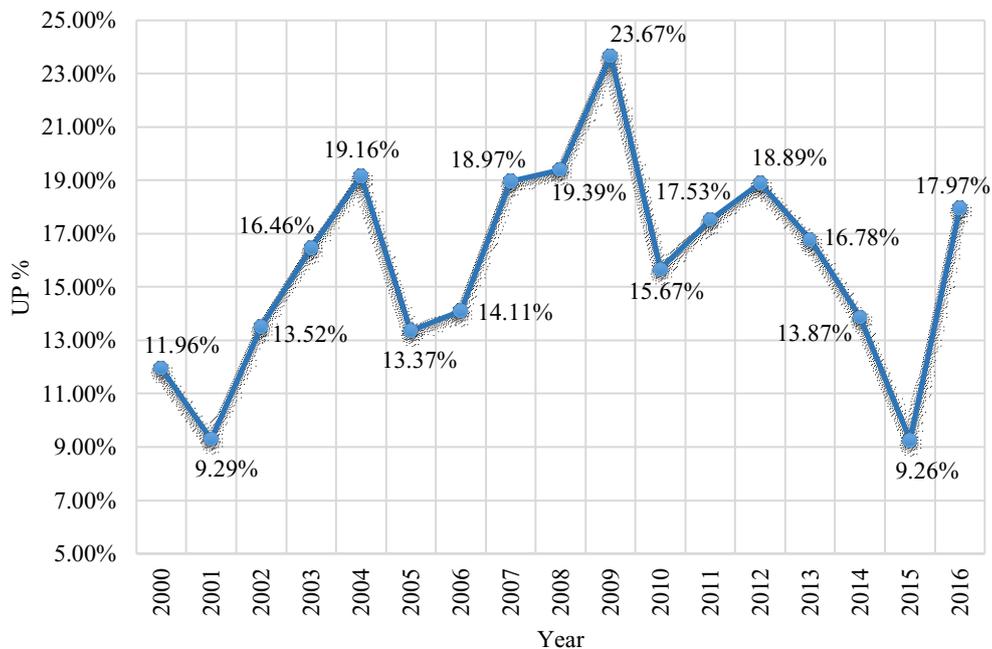
number of underwriter-investor relationship in the year previous the IPO, while the second refers to the two year previous the IPO. The following subchapter provide explanation on how these measures are computed. The mean of underpricing is 15,61%. Figure 4.1 provides the average underpricing calculated on the full sample (1,677 US IPOs) for each year from 2000 to 2016. “Pap” is the price adjustment expressed in percentage form. It is also called expected underpricing and it can be used as proxy of investors’ interest on the IPO. On average, underwriting fees are \$11,4 million. “Uwr” measures the underwriter reputation. The average rank of an underwriter is 8,26, out of a maximum attainable of 9; so, on average, only highly ranked underwriters followed the issues in our sample. The number of lead underwriters for each offer is represented by “numbank” variable. The minimum number of lead underwriter is 1, which means that no firms in the sample have conducted the IPO on its own. In the sample, firms go public, on average, 17 years after their foundation. The average value of total assets of the listing firms prior to the offer, as a measure of the level of operations, is US\$1,864 billion. An indication of Equity retention is provided by “Butler” variable. In general, the value of firms at the point of flotation seems to be positively related to the amount of equity retained by the original owners. The shares retained by insiders’ amount to approximatively 57%. The offer size variable indicates that, on average, firms have US\$231 million. Finally, “nnipo” is a thermometer that indicates if the IPO market is hot or cold. It indicates how many IPOs have taken place in the three month preceding the considered IPO.

Table 1. Summary statistics

	Mean	25th Percentile	Median	75th Percentile	Std. dev.
Avgann	2,71	0,90	2,22	3,78	2,47
Avgbi	4,50	1,58	3,46	6,28	4,20
Up	15,61	0,00	0,55	16,18	40,22
Pap	-1,80	-10,00	0,00	7,28	14,18
Fee	11,44	4,30	6,84	11,97	15,52
Uwr	8,26	8,00	8,50	9,00	1,07
Numbank	2,69	2,00	2,00	3,00	1,71
Age	17,03	5,00	9,00	18,00	23,58
Asset	1864,30	24,83	73,05	365,33	14556,50
Butler	0,57	0,00	0,54	1,28	1,13
Osize	231,71	0,37	1,04	2,49	5322,03
Nnipo	15,12	8,00	13,00	18,50	11,71

Table 1 reports mean, 25th percentile, median, 75th percentile and standard deviation of each variable. The statistics are calculated on the final sample composed of 551 US IPOs from 2000 to 2016.

Figure 4.1 Average Underpricing per year



4.2 Methods

The major issue of the analysis is how to give an order of magnitude to the relationship between regular institutional investor and lead underwriter. Previous literature suggests different kind of measures. Pollock et al. (2004) defined a Deal Network Embeddedness measure calculated using a Herfindahl index. Binay, Gatchev and Pirinsky (2007) creates a measure by estimating for each IPO the excess probability of allocating the IPO shares to investors who have previously participated in IPOs of the same lead underwriters. Goyal and Tam (2011) classify active institutions as having an IPO relationship with the underwriter if the institution received an allocation in a previous IPO managed by the same underwriter during the previous 90 days relative to the IPO under consideration. Values close, or equal, to one indicate a strong relationship between the investor and the underwriter. Our relationship measure is similar to that of Goyal and Tam.

As stated in subchapter 4.1, our relationship measure involves the first reported holdings at the end of the offering quarter as a proxy for participation in the IPO (Reuter, 2006; Ritter and Zhang, 2007; Goyal and Tam, 2011; Field and Lowry, 2009). First, we identified for each IPO the name of the lead managers and the name of investors who declared holdings at the end of the offering quarter. Then, all the possible pairs of underwriters-funds for each IPO in the sample is calculated. We searched for the recurrence of these pairs in two different time spans, specifically, a year and two years before the considered IPO. Finally, each value is divided by the number of different couples in the IPO in order to take proper account of the relative effect of these relationships.

Formally, relationship measure is calculated as follows:

$$k = \sum_{i,j} \frac{D_{ij}}{N_{ij}}$$

where k is the IPO of our sample, D_{ij} is the number of deals in the years (or in the two year) before the IPO k , in which underwriter j took part and the institutional investor i owned shares. N_{ij} represents the number of different pairs of underwriter j and investor i present in the IPO k .

The cross-sectional data has been utilized to account for the underpricing as a dependent variable. The explanatory variables, which have been employed, are: price adjustment in percentage (pap); fees paid by the issuer (fee); the underwriter reputation (uwr); the natural logarithm of the number of the lead underwriters in the offer ($lnnumbank$); the natural logarithm of the time span between foundation and IPO of the firm ($lnage$); assets ($asset$); a measure of equity retention ($butler$); the offer size ($osize$); the natural logarithm of the number of IPOs that took place within the three months preceding the considered IPO ($lnnipo$) and our measure of relationship ($avgann$ or $avgbi$).

In order to test if the relationship between the IPO underpricing and the regular investors participation is negative, a linear regression model analysis is carried out based on the sample described before. OLS regression is the most popular statistical technique used in the IPO underpricing analysis by the previous researchers. In our case, OLS assumption check reveal that variance of error terms is constant (White test shows p -value equal to 0,757972).

The estimated model is:

$$\text{Underpricing} = \beta_0 + \beta_1(\text{pap}) + \beta_2(\text{fee}) + \beta_3(\text{uwr}) + \beta_4(\text{Innumbank}) + \beta_5(\text{Inage}) + \beta_6(\text{asset}) + \beta_7(\text{butler}) + \beta_8(\text{osize}) + \beta_9(\text{Innnipo}) + \beta_{10}(\text{avgann})$$

when assessing the magnitude of the relationship of the year previous the IPO on underpricing and

$$\text{Underpricing} = \beta_0 + \beta_1(\text{pap}) + \beta_2(\text{fee}) + \beta_3(\text{uwr}) + \beta_4(\text{Innumbank}) + \beta_5(\text{Inage}) + \beta_6(\text{asset}) + \beta_7(\text{butler}) + \beta_8(\text{osize}) + \beta_9(\text{Innnipo}) + \beta_{10}(\text{avgabi})$$

when considering the two-year relationship preceding the IPO.

4.3 Multivariate results

In this part, the thesis will present the multiple linear regression analysis. Results of the regression analyses are shown in table 2.1 and 2.2.

Table 2.1 Multiple linear regression results

Model 1: OLS, using observations 1-1677 (n = 551)

No. of missing values: 1126

Dependent variable: up

Heteroscedasticity-consistent standard errors, HC1

	<i>Coefficient</i>	<i>Std. error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	-6,87946	12,0207	-0,5723	0,5674	
Pap	-0,0399593	0,113928	-0,3507	0,7259	
Fee	0,0266197	0,112563	1,970	0,0494	
Uwr	2,55543	1,50025	1,703	0,0891	*
Lnnumbank	2,16700	3,16682	0,6843	0,4941	
Lnage	-2,62000	1,41866	-1,847	0,0653	*
Asset	2,34329e-05	7,29897e-05	0,3210	0,7483	
Butler	0,959010	1,16824	0,8209	0,4121	
Osize	-7,64286e-05	2,95938e-05	-2,583	0,0101	**
Lnnipo	3,54216	1,71281	2,068	0,0391	**
Avgann	-1,59358	0,628281	-2,536	0,0115	**

Mean dependent var.	15,60552	S.D. dependent var.	40,21805
Sum squared resid	870949,4	S.E. of regression	40,13797
R-squared	0,022088	Adjusted R-squared	0,003979
F(10, 540)	1,756501	P-value(F)	0,065713
Log-likelihood	-2810,749	Akaike criterion	5643,499
Schwarz criterion	5690,928	Hannan-Quinn	5662,032

Table 2.2 Multiple linear regression results

Model 1: OLS, using observations 1-1677 (n = 551)
No. of missing values: 1126
Dependent variable: up
Heteroscedasticity-consistent standard errors, HC1

	<i>Coefficient</i>	<i>Std. error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	-6,93629	11,9661	-0,5797	0,5624	
Pap	-0,0430440	0,114366	-0,3764	0,7068	
Fee	0,0304948	0,112308	0,2715	0,7861	
Uwr	2,52560	1,48143	1,705	0,0888	*
Lnumbank	2,26970	3,18294	0,7131	0,4761	
Lnage	-2,62682	1,41545	-1,856	0,0640	*
Asset	1,59026e-05	7,32070e-05	0,2172	0,8281	
Butler	0,979750	1,16847	0,8385	0,4021	
Osize	-7,86926e-05	2,98827e-05	-2,633	0,0087	***
Lnnipo	3,59241	1,72235	2,086	0,0375	**
Avgbi	-0,942792	0,362468	-2,601	0,0095	***

Mean dependent var.	15,60552	S.D. dependent var.	40,21805
Sum squared resid	870806,3	S.E. of regression	40,13423
R-squared	0,021149	Adjusted R-squared	0,004164
F(10, 540)	1,865177	P-value(F)	0.047505
Log-likelihood	-2810,698	Akaike criterion	5643,396
Schwarz criterion	5690,825	Hannan-Quinn	5661,929

The dependent variable of these models is underpricing (up). Asterisks ***, **, * indicate that individual estimated regression coefficients are significantly different from zero at the 1%, 5% and 10% level respectively.

Table 2.1 and Table 2.2 show very similar results. Price adjustment, natural logarithm of the number of lead underwriters, “Butler” variable, “Assets” and “Fee” are statistically insignificant at the 10% level and no conclusion can be made.

As regards the natural logarithm of age, the negative sign of coefficient shows that older firms meet lower underpricing when they decide to go public. Older companies have proved that they can survive and operate in the market for a long time and therefore they often have a higher reputation. Also, the older the company is, the more financial information is available about the company (i.e. enough track records). This is the reason why J. Ritter (1984) argues that older companies have to leave less money on the table to compensate investors for the amount of information that is available about the company. Therefore, investments in older companies are seen as less risky or less uncertain. Less riskiness and uncertainty allow to boost up the offer price and so, to lower the underpricing. So, the result is in line with previous literature.

The positive relationship between “*uwr*” and underpricing shows that, on average, more prestigious underwriters are associated with higher levels of underpricing. In the 1980s prestigious underwriters were associated with less underpricing, that is IPOs taken public by prestigious underwriters benefit from superior certification of firm quality (Carter and Manaster, 1990 and Carter et al., 1998). In other words, high quality underwriters are able to better set a fair offer price that reflect the firm’s high value and few adjustments in the first day of trading are needed. Such negative relationship become positive in the 1990s. Beatty and Welch (1996), Cooney et al. (2001) and Bates and Dunbar (2002) all find a positive relationship between underwriter reputation and underpricing over the 1990s in

the United States. Beatty and Welch (1996) suggest that the change in the relationship between underwriter reputation and underpricing is most likely due to differences in economic environment in the 1990s versus the 1980s but they don't go further. Loughran and Ritter (2004) provide a reasonable explanation about the positive sign. They argue that analyst coverage became a more important factor for issuers choosing a lead underwriter since the 1990s. As issuers placed more importance on hiring a lead underwriter with a highly ranked analyst to cover the firm, they became less concerned about avoiding underwriters with a reputation for excessive underpricing. They call this desire to hire an underwriter with an influential but bullish analyst the analyst lust hypothesis. In addition, Liu and Ritter (2011) confirm the change on the issuer objective and posit that issuers care not only about IPO proceeds, but also about non-price dimensions of IPO underwriting such as underwriter quality, industry expertise, and analyst coverage from influential analyst. So, today certification hypothesis still true if it is stated and interpreted in a different manner: prestigious underwriters are not anymore being associated with lower underpricing, but issuers continue to hire these underwriters. Probably, prestigious underwriter still certifies the high issuer quality, but not through a lower underpricing (i.e. higher offer price). For example, underwriters with high reputation is able to ensure greater analyst coverage (Weber, Willenborg and Yang, 2018). High quality firms may look for analyst coverage (specially all-stars analysts) in order to give a fair proof of their high value. Moreover, if a prestigious analyst is covering the firm, the latter benefits from more publicity and visibility among investors, which drive up demand and the underpricing increase (Cliff and Denis, 2004). Since prestigious underwriters can attire more analysts (and more prestigious, affiliated or not) by paying them with more underpricing, the

positive relationship between “*uwr*” and underpricing is not strange since the 1990s (Cliff and Denis, 2004, Hong and Kubik, 2003; Weber, Willenborg and Yang, 2018).

Table 2.1 and 2.2 shows that offer size is negatively related to underpricing and statistically significant. Beatty and Ritter (1986) find an inverse relationship between the size of the issue and the initial return and suggest that smaller sized issues have a greater degree of uncertainty. The size of the IPO is supposed to be negatively related to the underpricing level because larger IPO’s are usually offered by well-known firms with several operating years and better records (Miller and Reilly, 1987, Clarkson and Simunic, 1994). This contributes to reduce the perceived risk of the IPO from the side of potential investors (Carter et al., 1998). As stated above, less uncertainty is reflected in higher offer price and thus, lower underpricing. Empirically, several studies report evidence for this negative relationship between the amount of raised funds and the level underpricing (Chalk and Peavy, 1990; Clarkson and Merkle, 1994; Carter and Manaster, 1990).

The natural logarithm of the number of IPOs in the three month preceding the considered IPO is positive and statistically significant. Ritter (1984) studies initial returns for US IPOs between 1960 and 1982 and finds highly significant autocorrelation in monthly average initial returns and in monthly IPO volume. Pastor and Veronesi (2005) observes that periods of high IPO volume are preceded by high market returns and followed by low market returns. This happens because firms tend to go public in response to market overvaluation. When market conditions worsen, stock prices drop and IPO volume declines because private firms choose to wait for more favorable market conditions before going public.

Finally, “avgann” and “avgbi”, that is the heart of the matter, reveal a negative and statistically significant connection between IPO underpricing and regular investors participation. These findings are in line with those of Benveniste and Spindt (1998) described at the beginning of this Chapter.

The final model of this analysis is obtained by running a stepwise procedure. The model is then replicated changing the variable “avgann” to “avgbi”. Table 2.1 and table 2.2 demonstrates that R-squared is approximately 2% and the adjusted R-squared is 0,4% in both cases. It means that 2% of the total variations in the initial return can be explained by all the independent variables. Although the R-squared value is not high, it still can be accepted since the purpose of the analyses is to find some statistically significant factors that influence IPO underpricing for the sample. The relatively low R-squared in the two models is not unexpected. If the R-squared was higher, it would imply that investors would be able to correctly predict the IPO performance, thus the level of underpricing. Hence, this result explains the presence of the underpricing puzzle on the capital markets.

The P-value (F) is less than 0,05 in Table 2.1 and is slightly greater than 0,05 in Table 2.2. The F value in regression is the result of a test where the null hypothesis is that all of the regression coefficients are equal to zero. If the p-value (F) is less than the alpha level, null hypothesis can be rejected. In other words, the model has predictive capability. The first model as a whole is significant at 0,10 significance level while the second is significant at 0,05 level.

4.4 Conclusions

This thesis examined the role of regular institutional investors on underpricing for a sample of 551 US IPOs from the period 2000-2016. The empirical analysis performed provides evidence that the presence of regular investors affects initial returns of an IPO. In particular, the higher the regular investor participation, the lower the underpricing. As Benveniste and Spindt (1989) state, lead underwriter may threaten to exclude regular investors in future offers. Regular institutional investors, therefore, are substantially forced to bid in good IPOs as well as in bad IPOs so as to maintain ties with underwriter and to remain preferred investors to allocate future offers.

Other several explanatory variables reflecting the main underpricing determinants identified in the literature are added in the model. All statistically significant variable signs are consistent with previous studies (e.g. Beatty and Ritter, 1986; Ibbotson & Jaffe, 1975; Lowry & Schwert, 2002).

To sum up, the analysis conducted in this thesis has highlighted the main determinants of underpricing with a focus on regular investors participation. The literature on underpricing is very broad, hence future researches may test even other relationship measures to prove better evidence on IPO underpricing.

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