

Initial Public Offerings from the Perspectives of
Issuers, Underwriters and Investors:
A Review of Financial and Psychological Work

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Abstract

This dissertation discusses initial public offering (IPO) and its two major phenomena: underpricing and underperformance. The dissertation reviews existent literature from both finance and psychology, from the perspectives of the three major parties in an IPO process: issuers, underwriters and investors. In each perspective, the context is unfolded according to either a logical decision making process or a sequential order of an IPO event. The results indicate that underpricing and underperformance should be perceived as joint results affected by all three parties via various parameters throughout the IPO process. Financial factors include asymmetric information and information accuracy; psychological factors include cognitive, affective and social factors. Financial and psychological factors impact underpricing and underperformance to different extents.

Keywords: initial public offering (IPO), underpricing, underperformance, asymmetric information, cognitive bias, affective bias, social influence, investor psychology

Introduction

Initial public offerings (IPOs) are the first time that a company sells equity shares on a security exchange (Megginson & Weiss, 1991). 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 (2014c), 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. Although IPOs have consistently produced shares worth over \$20 billion per year since 2010, 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 have IPO shares have captured significant attention from stock market investors market, but the phenomena that they have brought about 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., Chiang, Hirshleifer, Qian, & Sherman, 2011; Kaustia & Knüpfer, 2008).

This dissertation will review both the finance and psychology literatures. From finance, concepts such as the short-term underpricing phenomenon, the long-term

underperformance phenomenon, the going public process, and the tasks of the three main parties (issuers, underwriters and investors) in the going public process will be introduced. From psychology, the interactions among these main parties, the cognitive biases that might affect the going public process by influencing these main parties, and the incentives affecting these main parties will be discussed. Because the discussion will focus on the main parties that mentioned repeatedly above, this dissertation will be structured in three parts based on the roles of the main parties in the IPO process: the issuers (providers of IPOs), the underwriters (distributors of IPOs), and the investors (purchasers of IPOs). All of the three parties influence the entire going public process in significant ways. For instance, issuers determine the time of the issuance and the amount of capital they wish to raise through an IPO (Ritter & Welch, 2002); issuers and underwriters jointly determine the initial price of the IPO shares (Ljungqvist & Wilhelm, 2003); underwriters choose investors to whom the IPO shares will be allocated (Jenkinson & Jones, 2009b); and issuers' performance, investors' demand, and investors' trading patterns affect the long-term performance of IPO shares in the secondary market (Fama, 1998; Teoh, Welch, & Wong, 1998).

Issuers are often the top executives of companies and generally have full authority to determine whether the company will go public, and if so, when. For instance, the timing of going public is one of the essential factors that influence the initial prices of IPO shares and whether the issuance will be successful (Gulati & Higgins, 2003; Ibbotson & Jaffe, 1975; Ritter & Welch, 2002). In most cases, an IPO is considered successful when the market price on the initial date (first day of issuance) in the

secondary market is higher or significantly higher than the initial price (Babich & Sobel, 2004; Murrell, 2014). For instance, the IPO of Alibaba China on 18 September, 2014 was considered a huge success not only because it raised the largest amount of capital (\$21.76 billion) in IPO history (Renaissance Capital, 2015a) but also because the peak of the market price on the initial date was \$99.70 per share, while the initial price was \$68 per share (Dohmen, 2014). On the contrary, the IPO of Facebook was considered less successful, or sometimes even a case study of IPO failure. This is because the underwriters of Facebook's IPO (Morgan Stanley, JP Morgan and Goldman Sachs) had to purchase shares worth a total of \$11.76 billion to maintain the market price on the initial date above the initial price of \$38 per share (Worstell, 2012).

Indeed, when the gap between initial price and market price is considered the main determinant of a successful IPO, the timing of going public will be considered one of the crucial factors for a successful IPO. This is the case because empirical evidence indicates that *hot issues* and *cold issues* tend to both appear in a relatively compact period of time (Ibbotson & Jaffe, 1975). Specifically, hot issues refer to the IPOs that have higher market prices on the initial date than their initial prices, i.e., successful IPOs. Cold issues refer to IPOs that have lower market prices on the initial date than their initial prices, i.e., unsuccessful IPOs. Furthermore, a *hot issue market* refers to a period of time in the stock market when many companies go public and investors exhibit considerable demand for these IPOs. Conversely, a *cold issue market* exhibits the opposite traits (Ibbotson & Jaffe, 1975). Statistics from Ritter (2014c) indicate that over 800 companies went public during the *internet bubble period (1999 to 2000)*, with

an average first-day return of over 50 percent; by contrast, approximately 60 companies went public from 2008 to 2009, with an average first-day return of less than 10 percent. These are typical examples of a hot issue market (1999 to 2000) and a cold issue market (2009). The abovementioned first-day return is calculated as the closing price after the first trading day divided by the initial price minus one (Loughran & McDonald, 2013). For instance, a 50 percent first-day return rate means that when an investor invests \$10 in an IPO share before it begins to trade in the stock market, his or her investment will worth \$15 by the end of the first trading day once this IPO is available to public investors. Hence, the larger a first-day return is, the “hotter” the related IPO is. Moreover, the first-day return is also used to measure the extent of IPO underpricing (Derrien & Womack, 2003), which will be discussed in detail in Chapter 1, where basic IPO concepts will introduced. In brief, underpricing describes the situation in which most IPOs have lower initial prices than their prices in the secondary market (Derrien & Womack, 2003).

In the short run, issuers influence decisions such as the timing of going public, which has a significant impact on the success of an IPO. In the long run, issuers also play an important role in company performance on both strategic and operational factors, both of which are closely related to the stock price fluctuations in the secondary market (Alavi, Pham, & Pham, 2008; Bruton, Filatotchev, Chahine, & Wright, 2010). As a result, during the entire IPO process, the timing of going public, the extent of underpricing, and a stock’s after-market performance are all direct results of executives’ decisions. Moreover, the decision-making process of issuers can be perceived as a

combined output of interactions among executives' risk attitudes, likelihood of overconfidence, possible cognitive biases and the effects of other psychological elements (Alavi et al., 2008; Barry, 1989; Cooper, Woo, & Dunkelberg, 1988; Hirshleifer, Low, & Teoh, 2012). All of which will be discussed in Chapter 3 of this dissertation.

Underwriters help issuers to sell IPOs to the investors. In addition to issuers, underwriters are another main party that has a significant influence on the going public process. Underwriters are also referred as the *underwriter syndicate* in which a group of investment banks or commercial banks collaborate to sell an IPO's shares in the stock market (Puri, 1999). An underwriter syndicate exercises combined functions as a consultant or an advisor throughout the going public process, a salesman for the IPO shares, and sometimes even a wholesaler that purchases a large number of new shares when necessary (R. Aggarwal & Conroy, 2000; Lin & McNichols, 1998). Among all its tasks, one of the most important functions of an underwriter syndicate is to suggest the initial price for an IPO to issuers. Under most circumstances, the initial prices are lower than the closing price on the initial date, after the shares begin to trade in the stock market (Loughran & Ritter, 2004; Lowry & Schwert, 2004). For reasons that will be discussed in Chapter 4, underwriters are always held to be responsible for underpricing.

Studies have long focused on the correlations between underwriter characteristics and the extent of underpricing. For instance, a recent empirical study focusing on the underwriter's network as an independent variable showed that lead underwriters that

maintain a reciprocal relationship with their peers tend to underprice more than those that maintain a diverse peer relationship. This is likely because the partners involved in a reciprocal relationship tend to compensate one another with underpricing (Chuluun, 2015). Early studies from the 1990s focusing on the underwriter's reputation as an independent variable showed that underwriters with better reputation underprice significantly less. This is likely due to the reputational concerns of the underwriters (Michaely & Shaw, 1994). In practice, underwriters tend to encourage underpricing. They take measures such as establishing personal accounts for venture capitalists (who are the potential purchasers of IPO shares) and executives of issuing companies, which are allocated hot issues (Loughran & Ritter, 2004). Thus, both empirical studies and anecdotal evidence show that underwriters are correlated with underpricing from various perspectives, which is one of the examples of all of the influential functions underwriters fulfill during the going public process. Chapter 4 provides further details on underwriters' functions, including the functions of analysts, in the going public process, and the possible ethical problems affecting underwriters and cognitive biases such as overconfidence of analysts will also be presented.

From the perspective of investors, one of the reasons that IPOs attract so much attention is because issuers and underwriters typically leave large amount of money on table through underpricing. Hence, profits can be generated in a rapid and relatively easy way, especially for speculators who engage in flipping activities (immediately selling the IPO shares in the secondary market) (Loughran & Ritter, 2002; Ritter, 2014c). This can cause phenomena such as over subscriptions of IPOs in the primary

market, flipping activities after the initial date, and increased trading volume after the lockup period (Field & Hanka, 2001; Geczy, Musto, & Reed, 2002). These phenomena can be attributed to investors' cognitive or affective biases, such as the disposition effect, or attributed to social factors such as media influence or interpersonal communication (Ang & Schwarz, 1985; Dungore, 2011). For instance, the disposition effect encourages investors to sell winning stocks too soon and hold losing stocks for too long (Kaustia, 2004; Weber & Camerer, 1998). The media might influence investors to be net purchasers of stocks that attract greater attention, specifically IPOs (Barber & Odean, 2008). Interpersonal communication is likely to influence investors who follow the investment decision of others, especially in ambiguous situations such as IPOs (Bikhchandani & Sharma, 2000; Rook, 2006). These biases or factors have strong effects on non-professional individual investors, which will be explained in detail in Chapter 5

This dissertation will be divided into 6 Chapters. Chapter 1 will introduce basic IPO concepts, such as means of raising public equity, reasons for going public, and the IPO process; it will also describe noted IPO phenomena, such as underpricing, flipping activities, and underperformance. Chapter 2 will provide an overview of the multiple agency relationships involving the three main parties in the IPO process, namely, are issuers, underwriters, and investors. The various interests among them will be stated and possible interest conflicts will be analyzed. Chapter 3 will highlight possible psychological factors affecting IPOs and top executives that might influence the latter's decisions throughout the IPO process, such as overconfidence and founder status.

Chapter 4 will present the relationship between IPO companies and underwriters, including the functions of the underwriter syndicate, the influence of underwriter reputation, and psychological effects on analysts and underwriters, such as herd behavior and reputational concerns. Chapter 5 will introduce the psychology and behaviors of various investors involved in the IPO process. Three types of investors will be discussed according to the time they enter the IPO process, namely, are venture capitalists, institutional investors and individual investors. The main focus will be placed on individual investors for the reason that this group of investors is usually considered more likely to exhibit cognitive or affective biases and be influenced by social factors. Chapter 6 will present the conclusions and highlight the contributions of this dissertation.

The overarching goal of this dissertation is to provide a comprehensive view and a thorough understanding of IPOs, to serve as a bridge linking psychology and finance in the field of IPO studies, and to identify gaps in the field and potential avenues for future studies. In particular, two of the most significant IPO phenomena that concern both of the short-term (underpricing) and long-term (underperformance) performance of IPO stocks will be explained in depth from the perspectives of issuers, underwriters and investors. Additionally, underpricing and underperformance will be analyzed from a psychological perspective, with a particular focus on when individuals are involved in important decision making related to IPOs. By explicitly highlighting cognitive, affective and social factors, this dissertation will hopefully be of use to investors to help them adopt a rational approach to trading in IPOs.

Chapter 1 General introduction to IPOs

How investors generally perceive the stock market and trade stocks might vary significantly across individuals. For instance, some people regard the stock market as a giant slot machine and essentially trade stocks as if they were gambling (Kumar, 2009). There are various theories that offer different methods intended to predict stock market trends. There are also theories arguing that trends may not be predictable at all.

Generally, these theories can be classified into three categories. The first category is supported by scholars who believe in market efficiency and contend that a stock market index should follow *a random walk*, whereby the prices of individual stocks change independently and patterns of price changes are unlikely to be repeated because such changes are memoryless (Fama, 1995; Perron, 1988). The second category is generally supported in practice by analysts who focus on the intrinsic value of a stock by estimating a firm's future income, an industry outlook, and general economic development. This method is called fundamental analysis, which assumes that the price of a stock is a representative of its intrinsic value and the future profitability of the firm (Abarbanell & Bushee, 1997; Dechow, Hutton, Meulbroek, & Sloan, 2001). The third category is supported by other analysts who employ a method called *technical analysis*, which is based on historical price data and does not consider the intrinsic value of a given stock (Taylor & Allen, 1992). With the development of computer science and learning algorithms, scholars from the third category have created computer systems based on a *modular neural network*, which managed to accurately predict Tokyo Stock Exchange Price Indexes (Kimoto, Asakawa, Yoda, & Takeoka, 1990), or even models

based on the movements of bacteria on a micro level, which were able predict stock market trends one day ahead and fifteen days ahead from 1998 to 2008 (Y. Zhang & Wu, 2009).

Although there are various theoretical categories, the future trend of the stock market is a hot topic for both scholars and investors. As a result, it is important to understand how each individual stock initially comes into circulation in the market, which makes IPOs and the going public process significant.

In addition to IPOs, there are other methods to raise public equity capital, i.e., selling stocks to public investors in the stock market. Together with two major issues that need to be considered before going public, i.e., why to go public and when to go public, this chapter will provide an introduction from the following four perspectives: 1) methods of raising public equity, 2) reasons for raising public equity, 3) the IPO process, and 4) IPO phenomena. Such basic concepts and introductions are important because they help to structure an overview of the different parties and how these parties collaborate, and they also may help to provide the reader with a further understanding of the following chapters.

1. IPO and Other Methods of Raising Public Equity

Going public by issuing IPO has likely received the most scholarly attention of all the methods that companies use when raising public equity for the first time. To provide an overview of public equity raising methods, two other approaches, i.e., direct public offering (DPO) and reverse merger (RM), will be introduced together with IPOs in this

subchapter.

1.1 IPO: initial public offering

As mentioned in the Introduction, IPOs are the first time that a company sells shares in the stock market (Megginson & Weiss, 1991). 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). From the perspective of constructing assets, raising equity capital contrast with 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).

Additionally, as stated in the Introduction, there are three parties involved in the IPO process: issuers, underwriters, and investors. In short, the IPO process can be described as issuers recruiting underwriters to organize and sell the shares, while the shares are ultimately allocated to investors in the primary or secondary market (Jenkinson & Jones, 2009b). With respect to their activities over time, these three parties are active in three phases and two markets throughout the IPO process. These three phases and two markets include: 1) preparing to go public, 2) allocating IPO

shares in the primary market, and 3) trading the shares in the secondary market (Alavi et al., 2008). During the preparation phase, issuers and underwriters are the most active parties. During this stage, the main tasks for issuers are preparing their companies both financially and strategically for the IPO. For instance, adopting audited financial statements in accordance with IPO regulations, establishing anti-takeover strategies, and so forth (Lipman, 2008). The main tasks for underwriters include preparing relevant documents, such as filling the S-1 Form to secure approval from the Securities and Exchange Commission (SEC), in the U.S. (Loughran & McDonald, 2013), and preparing the preliminary prospectus that discloses necessary information on the issuer (Bhabra & Pettway, 2003). After the preparation is completed and the SEC approves the IPO, the focus of the IPO process shifts to share allocation, which takes place in the primary market. During this phase, issuers and underwriters allocate the IPO shares to investors (mostly institutional investors) before the shares become publicly tradable in the secondary market (Jenkinson & Jones, 2009b). In other words, the allocation phase lasts until the initial offering date or in some cases before the expiration of the lockup period (Field & Hanka, 2001). The market in which the IPO shares are allocated is known as the primary market (Spindt & Stolz, 1992). After the primary market ends, IPO shares are made available to the public investors, and this is when the secondary market becomes active. In the secondary market, shares can be freely traded among public investors, and typically when people refer to the stock market, they are referring to this secondary market (Mauer & Senbet, 1992). This is the third phase, and investors are the most active party among here (Figure 1). The various functions and main tasks

of the issuers, underwriters and investors during these three phases will also be highlighted in detail in Chapters 3 through 5.

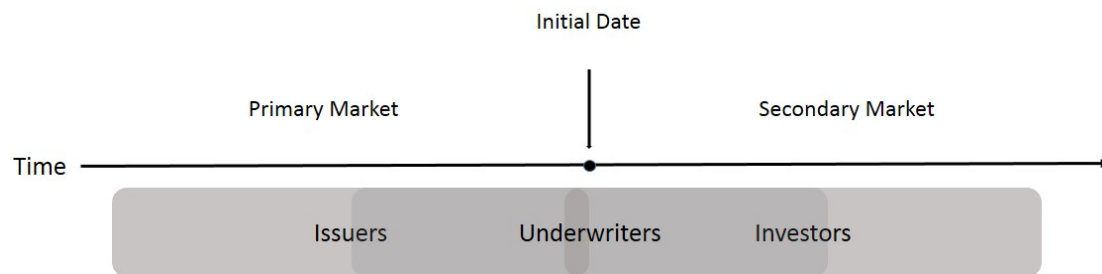


Figure 1. *Timeline of the IPO process, where three main parties (issuers, underwriters and investors) and two markets (primary market and secondary market) are involved. The shadows of the three parties demonstrate in which stage they are active, and the overlapping shadows mean that more than one party are involved.*

1.2 DPO: direct public offering

The main difference between a direct public offering (DPO) and an IPO is whether underwriters are involved in the going public process. As its name implies, a DPO describes a process in which issuers directly sell their stocks to investors without assistance from underwriters (Sjostrom Jr, 2001). Wendt (2008) suggested two main scenarios when companies would prefer to conduct a DPO: first, when underwriters are unwilling to cooperate with issuers that do not meet their standards, for instance, when the issuers have small firm size, poor performance in the pre-offering years, or insufficient potential for future development; second, when the cost of hiring underwriters exceeds the issuer's budget. A further conclusion that can be drawn based on these two scenarios is that when a company raises capital through a DPO, both its current financial situation and its future potential development could be less appealing compared with companies that choose to conduct IPOs. This might be due to

unappealing features such as the observation that, from 1995 to 1999, nearly 40 percent of DPOs that attempted to raise capital through the internet were unable to attract any capital (Jones, 1999, as cited in Sjostrom Jr, 2001). Additionally, according to Anand (2003) less information is published during DPOs because fewer documents are subject to disclosure compared with IPOs. Thus, due to information asymmetry, it is difficult for investors to determine the quality of a new DPO. Under such circumstances, investors always demand a risk premium, and thus companies usually have to issue DPOs at discounts (Wendt, 2008).

While there are disadvantages, DPOs also offer several advantages. For instance, compared with conducting an IPO, a DPO is less costly (no need to hire underwriters), faster (the firm can typically go public within a month), and easier (fewer documents are required, there are fewer regulatory restrictions, and the going public process is simpler) (Anand, 2003). Hence, Anand (2003) argued that when the underwriting fee exceeds the additional transaction costs required in a DPO and when a proper information revealing system can be created for investors, conducting a DPO can be more efficient than conducting an IPO.

The development of DPOs has been relatively slow and uneven. The first DPO conducted through the internet was launched in March 1996 by a company named “Spring Street Brewing” (Rosenbloom, 2004). After approximately two decades of disuse, the DPO began to be adopted again in the U.S. in 2012. This reemergence was due to the passage of the JOBS Act (the Jumpstart Our Business Startups Act) in 2012 in the U.S., after which a new method of funding called *crowdfunding* has burgeoned

(Stanberry & Aven, 2014). Crowdfunding allows issuers to raise capital directly through the internet, by issuing an open announcement (Belleflamme, Lambert, & Schwienbacher, 2014). Though some scholars perceived it as “a new version of IPO” (Stanberry & Aven, 2014, p. 1383) or regarded it as “putting the ‘I’ in the IPO” (Walker, 2013, p. 88), in my opinion, crowdfunding should be considered a DPO for the following reasons: 1) crowdfunding raises capital directly from potential investors, which matches the concept of a DPO; 2) the entire funding process is carried out without underwriters; and 3) similar to most DPOs from the 1990s, the fundraising process is highly reliant on the internet (Sjostrom Jr, 2001; Wendt, 2008).

Practical evidence shows that crowdfunding, and DPO trading more generally, is usually conducted by small companies through online advertising (Stanberry & Aven, 2014). The crowdfunding boom, in my opinion, buffers the extra demand of individual investors for investing in developing companies or industries because most IPOs are distributed to institutional investors in the primary market (Jenkinson & Jones, 2009b). I introduced DPOs primarily to provide background information on raising public equity and not as the main focus of the dissertation, the topic will not be further discussed.

1.3 RM: reverse merger

In addition to conducting a DPO, a reverse merger (RM) is another way to go public without involving underwriters. It helps companies going public by merging with a special purpose acquisition company (SPAC), i.e., a shell public company (Datar,

Emm, & Ince, 2012). A shell public company essentially exists to be taken over; hence, it has only nominal operations but almost no nominal assets, or if it has any, they are mainly cash equivalents (Sjostrom Jr, 2007). After the merger, the newly formed company will obtain the assets and liabilities of both the shell company and the original operating company, which is the firm that starts the merger. The name of the new company, the executives and the officers will be obtained directly from the operating company, and the shell company's shares continue to be traded publicly as they were before the merger. In this way, the operating company succeeds to the SPAC's position in the stock market, and thus becomes publicly owned (Adjei, Cyree, & Walker, 2008; C. M. Lee, Li, & Zhang, in press; Sjostrom Jr, 2007).

According to Brenner and Schroff (2004), under most circumstances, going public through an RM is considered faster than both DPOs and IPOs, lasting for only a few weeks, because it does not have to go through all of the procedures required in a DPO or an IPO. It is more expensive than a DPO but still less costly than an IPO. Additionally, this approach can be less vulnerable to the stock index fluctuations than an IPO because in the stock market, merger activity is always perceived by investors as favorable news (Adjei et al., 2008). Aydogdu, Shekhar, and Torbey (2007) provided empirical support for this suggestion and demonstrated that trading activity increased immediately after the announcement of a merger.

The research on RMs has become increasingly popular in recent years (Feldman, 2012; Floros & Sapp, 2011). Additionally, in the U.S., SEC regulations on RMs have become stricter since 2004 (Aydogdu et al., 2007). In my opinion, the increased

restrictions, rules and laws could be perceived as a sign that RMs might begin to attract more capital in the stock market than they have previously. Hence, from another perspective, becoming an SPAC could be one of the reasons why a company pursues an IPO. In other words, shell companies conduct IPOs only to be taken over through an RM in the future, and thus reverse mergers and SPACs will be further discussed as reasons for raising public equity through IPOs in the following subchapter.

2. Reasons for Raising Public Equity Through IPOs

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). Thus, one might ask, given the various financing options available, why would a company favor public equity financing over other methods?

This question can be answered from both financial and non-financial perspectives. From the financial perspective, one of the conventional answers would be these companies are willing to raise equity capital from a public market to allow their stockholders to freely exchange shares for cash in the future (Woojin Kim & Weisbach, 2005; Ritter & Welch, 2002). From the nonfinancial perspective, raising public equity might provide several benefits, such as enhancing companies' reputation (Bancel & Mittoo, 2009), improving the influence in the industry (Pagano et al., 1998), and increasing publicity (Ritter & Welch, 2002). Additionally, a DPO or crowdfunding

might even increase brand loyalty or the number of consumers because investors will be more likely to become active consumers after being involved in the investment (Schwienbacher & Larralde, 2012).

Of the various methods for raising public equity, IPOs have attracted the greatest amount of attention from both investors and scholars, which can be supported by evidence such as the constant excessive demand for IPOs during the subscription period and the numerous IPO related studies that have been conducted (Brau, Li, & Shi, 2007; Chuluun, 2015; Ritter & Welch, 2002; Shen, Coakley, & Instefjord, 2013). Although launching IPOs means that issuers have to wait for approval from regulators, complete sophisticated IPO procedures, and pay large commissions to underwriters, over \$25 billion has been raised annually through IPOs in the U.S. since 2010 (Ritter, 2014a).

Studies have been conducted from different perspectives in an effort to illustrate the reasons that issuers are scrambling to raise capital through IPOs. From the stock market perspective, positive correlations have been observed between the general market valuation and the number of IPOs issued in the market. For instance, as previously noted, in a hot issue market, many companies issue IPOs (Ibbotson & Jaffe, 1975). Additionally, the relationship between a hot issue market and hot issues can be reciprocal: hot issues (significantly underpriced IPOs) are more likely to encourage investors to purchase IPOs in the secondary market and increase the market price in general, which then generates a hot issue market. In return, the hot issue market tends to encourage more companies to conduct IPOs because this market condition increases the likelihood of conducting successful IPOs (considerably underpriced IPOs) (M.

Baker & Wurgler, 2007; Ljungqvist, Nanda, & Singh, 2006). This can be perceived as a period when the major investors are irrational about IPOs, and such irrationality has driven IPO prices higher in the secondary market than their intrinsic value warrants. In this scenario, low-quality firms might have seek to exploit the irrational market and issue low-quality IPOs at potentially inflated prices (Lowry & Schwert, 2002; Yung, Çolak, & Wang, 2008). Such free-riding behaviors by low-quality firms might only become evident in the long term. Statistics have revealed that during the internet bubble (1999 to 2000), 858 companies issued IPOs, which is 50 percent higher than the total number of firms that issued IPOs (1,547) in the subsequent 14 years, from 2001 to 2014 (Ritter, 2014a). However, after the bursting of the internet bubble, the entire market crashed, with the Dow Jones Index losing one third of its value and the NASDAQ Composite experiencing a sharp decline, from over 5,000 to 1,000 (Morrissey, 2004). As a result, from the stock market perspective, issuers, especially speculative issuers, might be eager to raise capital by issuing an IPO during specific periods such as in a hot issue market. This can prevent an unsuccessful issuance, although it might also create disasters in the stock market in the long term.

From the perspective of an individual company, few empirical studies can be found concerning why and when companies are willing to conduct IPOs. One explanation for this limited number of studies is the unavailability of pre-IPO firm-level financial data, which makes it difficult to compare the differences in companies' financial situations before and after the IPO. 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. This study was possible because Italy is one of the few countries in the world where financial data on privately owned companies, such as financial statements and bank credit records, are publicly accessible. By comparing the ex ante and ex post financial characteristics (including profitability, financial leverage, cost of credit, etc.) of companies that went public, firm size and market-to-book ratio in the industry were found to 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). Interestingly, Pagano et al. (1998) noted that companies were more likely to conduct an IPO due to financial structure considerations and less likely to do so to raise capital. 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 and managerial turnover increased (Pagano et al., 1998).

In addition to using data on financial characteristics in empirical studies on this topic, Brau and Fawcett (2006) conducted a survey on companies' reasons for going public. Their sample consisted of 336 chief financial officers (CFOs) from three types of firms: 1) firms that completed IPOs, 2) firms that withdrew their applications before the IPOs were completed, and 3) firms that were considered large enough to conduct IPOs but remained privately owned. Their survey included questions concerning the motives for conducting IPOs, the timing of going public, reasons for remaining private and other attitudes toward IPOs. "To facilitate acquisitions" (p. 399) was found to be

the most important motivation for conducting an IPO (Brau & Fawcett, 2006). In other words, most of the CFOs in the sample issued IPOs to take over other firms in the future. In their follow-up study focusing on the cases of mergers and acquisitions, they found that conducting an IPO significantly increases the likelihood of a company taking over other firms than the possibility of it been taken over. Additionally, in such acquisition activities, public shares were used as payment in purchases of other firms (Brau & Fawcett, 2006).

Based on the empirical studies and other literature related to the reasons for issuing an IPO, Brau (2012) summarized all possible reasons into 13 opinions (Table 1). All of these opinions were supported by at least one peer-reviewed article. In this dissertation, based on the work of Brau (2012) and my understanding, three main perspectives on reasons to conduct an IPO are summarized from 1) the capital structure perspective, which is based on the notion that IPOs are conducted to increase equity and thus change the firm's capital structure; 2) the acquisition perspective, which is based on the notion that conducting an IPO increases the likelihood that a company becomes an acquirer or an acquiree; and 3) the insider group's perspective, which is based on the interests of the insider group, especially those who might benefit from an IPO, such as CEOs or CFOs.

Table 1 *Reasons for conducting an IPO*

Reasons for conducting an IPO
1. To minimize the cost of capital and optimal the capital structure
2. To overcome borrowing constraints or increase bargaining power with banks
3. To follow the pecking order theory of financing: equity > retained earnings > debt
4. To create a public market and use shares as a payment method for subsequent acquisitions
5. To establish a market price for subsequent sell-out
6. To create an analyst following, where IPO firms will experience favorable analyst following on average
7. To take the first-mover advantage and increase publicity
8. To use the window of opportunity, where IPOs might underperform after other IPOs
9. To herd because other firms in the same industry have gone or are going public
10. To allow more dispersion of ownership
11. To offer stock-based compensation after the IPO
12. To cash out, especially for venture capital backed IPOs
13. To pursue the personal interest of the CEO or CFO, such as in the case of Netscape

Adapted from "Why Do Firms Go Public", by J. C. Brau, 2012, The Oxford Handbook of Entrepreneurial Finance, pp. 18-19.

2.1 Capital structure perspective

The main focus of this perspective is determining a company's optimal capital structure. In essence the literature on corporate capital structure discusses the proportion of equity and debt in a company's total amount of capital (DeAngelo & Masulis, 1980; Myers, 1984; Titman & Wessels, 1988). How the optimal capital structure should be defined has been contested in traditional finance, and the main arguments include: 1) the optimal capital structure should maximize firm value, a position exemplified by Modigliani and Miller (1958); 2) the optimal capital structure should minimize the *weighted average cost of capital (WACC)*, as argued by E. Solomon (1963) or Chambers, Harris, and Pringle (1982); and 3) the process of raising capital should follow a certain order, such as *pecking order theory*, as argued by Myers and Majluf (1984). All three theories will be explained below.

The study of the corporate capital structure can be traced back to the 1950s. For example, Modigliani and Miller (1958) supported the theory that the capital structure should maximize firm value and stated that in a perfect market, the relative proportions of debt and equity should be irrelevant to corporate value because in a perfect market, one share of debt (bond) and one share of equity (stock) are perfect substitutes, and hence should be sold at the same price.

However, in reality, tax is calculated based on income after the payment of interests to creditors but before the payment of dividends to shareholders. The different timing of these payments from a tax perspective generates a *tax shield* effect, which

benefits companies with capital structures that are highly reliant on debt (Kane, Marcus, & McDonald, 1984; Miles & Ezzell, 1980). An extreme example to explain the function of a tax shield would be the following. Assume that both Company A and Company B have 1) the same amount of year-end income before paying interest, tax and dividends (\$10,000), 2) the same amount of total capital (\$80,000), 3) the same tax rate (30 percent), and 4) the same dividend and interest rate (5 percent each). The only difference is that the capital of Company A only consists of equity, while the capital of Company B only consists of debt. Company A has to pay \$3,000 in tax ($\$10,000 \times 30$ percent) and \$4,000 in dividends ($\$80,000 \times 5$ percent). Hence, the income after paying interest (\$0, as it has no debt), tax and dividends is \$3,000 ($\$10,000 - \$0 - \$3,000 - \$4,000$). Company B it has to pay \$4,000 in interest ($\$80,000 \times 5$ percent) before paying tax, then \$1,800 in tax after the interest is subtracted from income ($(\$10,000 - \$4,000) \times 30$ percent). Hence, the income after paying interest, tax and dividends (which is \$0) is \$4,200 ($\$10,000 - \$4,000 - \$1,800$). As a result, the tax shield generated in this example is \$1,200 ($\$4,200 - \$3,000$) (Table 2).

Table 2 *The result of a tax shield*

	Company A	Company B
Capital structure	\$80,000, equity only	\$80,000, debt only
Year-end income	\$10,000	\$10,000
Interest (5% interest rate)	\$0	\$4,000
Income after interests	\$10,000	\$6,000
Tax (30% tax rate)	\$3,000	\$1,800
Dividends (5% dividend rate)	\$4,000	\$0
Net Income	\$3,000	\$4,200

The difference between Company A and Company B created by the tax shield is \$1,200. Own illustration based on "How big is the tax advantage to debt?" by A. Kane, A. Marcus, and R. L. McDonald, 1984, The Journal of Finance, 39(3).

As in the example, when the tax shield is considered, the larger debt is relative to total assets, the more benefit a tax shield can create. A company reaches its maximized value when its capital is 100 percent debt. Additionally, the higher the tax rate is, the more a company can benefit from a tax shield (Modigliani & Miller, 1963). Thus, under this assumption, a company will not pursue an IPO because issuing equity shares would prevent it from benefiting from a tax shield.

The notion of the weighted average cost of capital (WACC) was introduced by E. Solomon (1963), who held that the cost of capital should be calculated in separate categories according to their proportional weights, i.e., calculate the cost of debt and equity separately. This theory, in my opinion, can be interpreted as another perspective on maximizing a company's value, using the approach of minimizing the cost of capital. Solomon (1963) argued this from two perspectives. From the perspective of creditors,

when the debt in a company reaches an excessive level, they are likely to demand additional interest, as operating risk is positively correlated with the amount of debt. From the perspective of equity shareholders, when the interest rates increase, the amount of earnings per share (EPS) will decrease. EPS describes a company's net income per share, and hence can be used as an indicator of a company's profitability. As EPS was found to have a significant influence on a company's stock price (Patell, 1976), when EPS decreases, equity shareholders are likely to demand a risk premium for their dividends. As a result, increased debt leads to an increased total capital cost (Figure 2). Additionally, the tax shield benefit generated by increased debt will be counterbalanced by increased capital costs. E. Solomon (1963) provided an important approach for measuring capital costs, and it has been used as one of the discount rates for calculating the present value of assets (Arnold & Crack, 2004; Tham & Vélez-Pareja, 2002). Additionally, many empirical studies have been conducted based on WACC (Kaplan & Ruback, 1995; Kyriazis & Anastassis, 2007; Miles & Ezzell, 1980; Nantell & Carlson, 1975). Thus, based on the theory that optimizing a firm's capital structure entails minimizing the cost of capital, the amount of IPO issuance should be increased accordingly to generate the smallest amount of WACC.

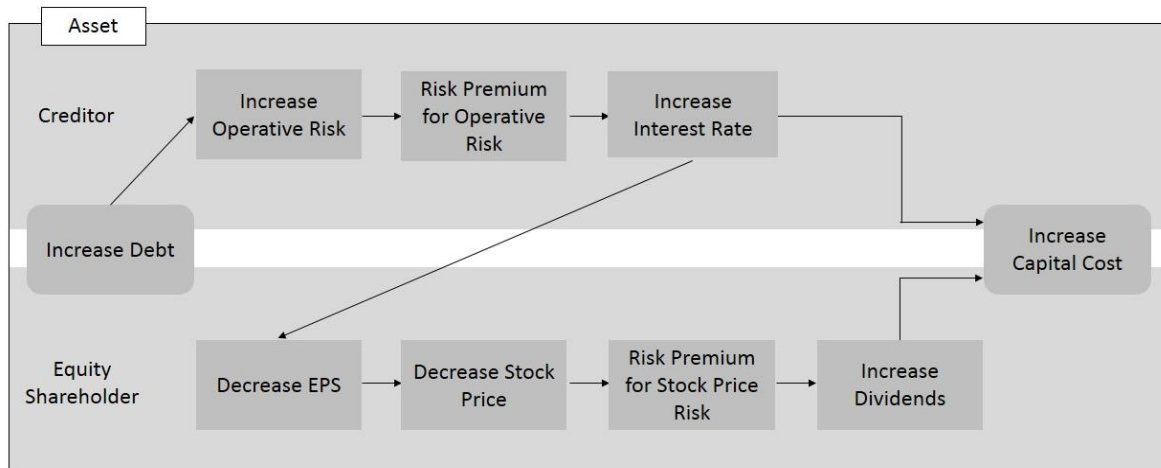


Figure 2 The influence of increase debt to capital cost, from the perspectives of both creditor and equity shareholder. Own illustration based on “Corporate Forecasts of Earnings per Share and Stock Price Behavior: Empirical Test”, by J. M. Patell, 1976, *Journal of Accounting Research*, 14(2).

Baxter (1967) advocated for a similar theory of capital costs. According to this theory, the cost of bankruptcy should be considered part of the cost of capital because a high proportion of debt increases the likelihood that a firm will go bankrupt. As a result, the value of a firm decreases as debt increases. Further studies supporting this theory held that a cost of bankruptcy, similar to taxes, is the result of market imperfections. When both taxes and cost of bankruptcy are unavoidable due to an imperfect market, they should be both considered when determining the optimal capital structure (Kraus & Litzenberger, 1973; Stiglitz, 1969). Consequently, similar to the above, when the cost of bankruptcy is considered, IPOs should be issued in an amount that creates the lowest capital cost when cost of bankruptcy is included in capital costs.

The third and last theory argues that the capital-raising process should follow a certain order because the cost of acquiring information also influences firm value (Frank & Goyal, 2003). Pecking order theory was hence developed based on asymmetric information and the cost it generates. 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.

The theories mentioned above focusing on constructing the optimal capital structure tend to perceive each firm as an independent, individual entity and the industry and the market as a simple aggregation of independent firms. Hence, theories based on these hypotheses only focus on internal measures, such as the cost of capital or the pecking order. However, firms no longer exist as separate entities. Hence, theories considering interactions, such as purchasing, mergers or takeover activities, between firms are categorized as the acquisition perspective and are introduced in the following subchapter.

2.2 Acquisition perspective

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, as introduced in Subchapter 1.3 (Sjostrom Jr, 2007). Acquirees in this context have already conducted IPOs with the aim of being taken over in a reverse merger, as the shell companies, i.e., conducting IPO in preparation for being acquired by other companies in the future (C. M. Lee et al., in press).

For acquirers, as previously stated, empirical evidence from a survey of 336 CFOs from companies with different IPO status showed that the main motivation for firms going public is to acquire other firms (Brau & Fawcett, 2006). Additionally, a follow-up study was conducted focusing on the 87 companies (of the 336 surveyed) that successfully conducted IPOs from 2000 to 2002. Prior to July 2004, 159 acquisitions took place, and in 141 of those cases, IPO companies were the acquirers. When comparing these IPO companies to the benchmark companies in the industry, the results showed that IPO companies were more likely to be either acquirers or acquirees relative to the benchmark companies: IPO companies were the acquirers in 141 cases, while the

corresponding figure for the benchmark companies was 96; IPO companies were acquirees in 18 cases versus 17 for benchmark companies. Thus, it can be assumed that conducting an IPO might encourage involvement in acquisition activities, on either side of the transaction. 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. (Sudarsanam & Mahate, 2003; Travlos, 1987). Empirical findings have indicated that, indeed, the shares raised during IPOs are usually used as payment in acquisitions (Brau, Francis, & Kohers, 2003).

Regarding potential acquirees, Zingales (1995) was the first to suggest that an IPO is preparation for a future sale. He argued that going public could help the owners to establish a market price for the company, thereby maximizing the proceeds from an acquisition. Further statistical evidence on companies issuing IPOs in preparation for being purchased is presented by Pagano et al. (1998). Using a sample of 12,528 Italian IPO companies from 1982 to 1992, they found that three years after the IPO, 13.6 percent of their sample sold the controlling stake in the company to an outsider, and the turnover rate in the control over IPO companies was twice that for Italian companies in general from 1980 to 1990.

To conclude, the acquisition perspective provides important reasons for conducting an IPO because the IPO makes companies more likely to take over another company or be taken over. Statistical evidence provided by Brau, Couch, and Sutton (2012) showed that engaging in acquisitions might be one of the main explanations for the IPO underperformance phenomenon, which has also been explained by many other

scholars from different perspectives (see Agrawal, Jaffe, & Mandelker, 1992; Loughran & Vijh, 1997). Specifically, their sample consists of 3,574 firms that completed IPOs from 1985 to 2003; for firms that acquired other firms in the first year after an IPO, the mean three-year adjusted abnormal return is -15.6 percent, compared to 5.9 percent for IPO firms that were not involved in acquisitions (Brau et al., 2012). One conventional explanation for this result is the hubris hypothesis advanced by Roll (1986), which argues that decision makers in acquiring companies tend to be overconfident and thus overpay for target companies, which directly leads to underperformance post acquisition. This hypothesis indicates that executives' psychological factors are vital to a company's performance in the long run, and related psychological mechanisms such as overconfidence will be discussed further in Chapter 3.

2.3 Insider group perspective

In addition to the reasons proposed by the capital structure perspective and the acquisition perspective, many studies suggest that firms pursue an IPO to advance the interests of insider groups, and these studies can be regarded as advancing the insider group perspective. As Brau (2012) noted, these interests can be: to cash out (X. Liu & Ritter, 2010), to increase compensation (Beatty & Zajac, 1994), or to simply accumulate personal fortune and prestige (Pollock, Chen, Jackson, & Hambrick, 2010).

The insider group includes investors who obtain inside information on an IPO firm, such as institutional investors (e.g., venture capitalists and investment banks), individuals (e.g., top managers and executives), or interest groups (e.g., shareholders

and board members) (Bradley, Jordan, Yi, & Roten, 2001; Brav & Gompers, 2003).

Venture capitalists invest in small startup firms that have limited historical performance information (Tyebjee & Bruno, 1984). Findings have indicated that many IPO companies have been supported by venture capitalists; for instance, from 2001 to 2013, an average of 41 percent of IPOs were supported by venture capitalists (Ritter, 2014b). Going public has been considered an exit strategy for venture capitalists, especially at the stage when a firm only consumes instead of generates capital (B. S. Black & Gilson, 1998). Specifically, evidence has been found that insiders attempt to sell IPO shares in the secondary market to cash out (Ang & Brau, 2003). Other than stock prices, the main difference between selling IPO shares in the primary market and the secondary market is that the net proceeds from selling in the primary market go directly to the issuing firm, while the net proceeds from selling in the secondary market go directly to the shareholders who sell the shares (Ang & Brau, 2003). Selling IPO shares in the secondary market can be considered one of the most effective ways to cash out (I. Lee, 1997). Because insiders possess prior information on the company in question, outsiders typically regard their selling behaviors as a signal that the shares are opportunistically overpriced (Brau et al., 2007). As a result, insiders' cash-out behaviors are often perceived as a negative signal for potential investors, especially when the selling comes from individuals such as top managers and executives. Statistical evidence indicates that during 1980s and 1990s, 23 percent of German IPO shares and 67 percent of Portuguese IPO shares were sold by insiders in the secondary market as a way to cash out (Jenkinson & Ljungqvist, 2001b). This empirical evidence

supports the notion that the cash-out behavior exists in different countries, and thus will be considered one of the reasons for conducting IPO according to the insider perspective. Furthermore, insiders' selling behaviors have been found to be correlated with long-term IPO underperformance (Brau et al., 2007).

Furthermore, conducting IPO can benefit top managers and executives who do not want to cash out while simultaneously benefitting interest groups such as shareholders and board members. For top managers and executives, if their commissions are correlated with stock performance, they might benefit from strong stock performance. This is because, from the conventional finance perspective, stock prices can objectively reflect firms' intrinsic value (Myers & Majluf, 1984; Wruck, 1989). On the one hand, going public is considered an additional way for the board to measure executives' performance; on the other hand, stocks are usually used as a means of incentivizing executives, such as through stock options (Bryan, Hwang, & Lilien, 2000). Furthermore, a previous study has shown that stock prices are directly correlated with executives' compensation (Holmstrom & Tirole, 1993). This compensation scheme was argued to be an effective method to increase executives' performance (Murphy, 2010) and as a means of reducing agency costs (Bebchuk & Fried, 2003). Hence, from the perspective of board members and shareholders, conducting an IPO is beneficial because it incentivizes executive performance and decreases agency costs; from the executives' perspective, conducting an IPO creates an alternative means of measuring their performance and increases the likelihood of increasing their personal wealth.

To conclude, based on all of the reasons for conducting an IPO according to above

three perspectives, the importance of IPO issuance has changed over time. Beginning from the conventional capital structure perspective, which argues that the level of equity does not necessarily influence a firm's value (Modigliani & Miller, 1958), to the position that external equity financing should be considered the option of last resort when raising capital (Myers & Majluf, 1984), to the internet bubble when the IPO market boomed (1999 to 2000), and finally, to the studies showing that conducting an IPO facilitates acquisitions (Brau & Fawcett, 2006; Brau et al., 2003), these developments indicate that conducting an IPO has become increasingly important in mainstream opinion. An IPO involves the interests of many parties, which will be discussed in Chapter 2. As IPO-related laws and regulations become increasingly stringent, the interests of all parties will also be better protected, despite the speculative intentions and desires on the part of some inside group members to cash out. The following subchapter offers a brief introduction of the IPO process and how other parties' interests are protected from speculative insiders.

3. IPO Process and Lockup Period

The IPO process begins with preparing for the issuance and continues until shares are made available to public investors in the stock market; underwriters and issuers are active parties throughout the process (Shefrin, 2002). The details of the 7 phases of IPO issuance will be introduced in Subchapter 2.3 of Chapter 4. Hence, only four key steps will be presented here, using the IPO process in the U.S. as an example. First, issuers and underwriters apply to the SEC to secure approval of the IPO. The application

includes a preliminary prospectus containing the anticipated initial price, number of shares, and other information on the company's business (U.S. Securities and Exchange Commission, 2015c). Second, underwriters conduct the main task, namely, launching a market campaign, or roadshow. The purpose of this step is to create a market for the new shares and acquire information on investors' willingness to buy the shares (Ritter, 2011). Third, a *quiet period* takes place, during which the issuer and underwriters are not allowed to publish any information on the issuer (U.S. Securities and Exchange Commission, 2015d). Fourth, underwriters and issuers issue the final prospectus containing the offering price and allocation of shares (Shefrin, 2002). Thereafter, new issues become effective and are sold in the secondary market.

After IPO shares begin to trade in the secondary market, as previously mentioned, some IPO-related laws and regulations protect the interests of different parties from speculative insider groups. Additionally, because most investors who receive a large number of initial shares are insiders, such as top executives, board members, and institutional investors, such as investment bankers and venture capitalists, the concept of the lockup agreement was created as a restriction to prevent large shareholders from engaging in flipping activities for a certain period of time (U.S. Securities and Exchange Commission, 2015b). This pre-specified period is called the lockup period, which lasts from 90 days to 365 days beginning from the issuance of an IPO (Field & Hanka, 2001).

However, studies have shown that the market consistently reacts negatively during the lockup period. Significant negative abnormal returns were observed after the expiration of the lockup period using a sample of 2,529 firms from 1988 to 1997; the

negative abnormal returns were concentrated among IPO firms supported by venture capitalists (Bradley et al., 2001). A similar result of significant negative returns around the time window of the expiration of the lockup period was found by Brau, Carter, Christophe, and Key (2004) using a sample of 5,720 IPOs from 1988 to 1998. This result, in my opinion, might be the result of deviations between the original intention of establishing the lockup agreement and the investors' interpretation of the lockup agreement. The lockup agreement was created to protect outside investors from bearing the risk created by inside investors' flipping activities due to information asymmetry (Brav & Gompers, 2003; Hölmstrom, 1979). However, investors might be prone to perceive the lockup period as a signal of adverse selection, whereby inside investors in low-quality firms are likely to cash out once the lockup period has expired (Brau, Lambson, & McQueen, 2005). As a result, it is considered likely that the price of IPOs will decline as the end of lockup period approaches (Brav & Gompers, 2000). Thus Brau et al. (2005) proposed that the lockup period should be shorter for firms that are more risky and more transparent.

To conclude, the abovementioned four steps primarily describe the part of the IPO process during which issuers and underwriters are the most active parties, and the lockup period was originally designed to protect all parties' interests. The details of how underwriters and issuers collaborate in each step, how each step might be related to IPO phenomena, i.e., underpricing and underperformance, and an extended discussion of the lockup period will be further presented in Chapter 4.

4. IPO Phenomena

There are several phenomena that emerge with the appearance of an IPO, and these phenomena have attracted considerable attention from investors and scholars. These phenomena include severe underpricing of the initial shares in the short term, frequent flipping activities after the initial date and the general underperformance of IPO companies in the long term. (R. Aggarwal, 2003; Asquith, Jones, & Kieschnick, 1998; Boehmer & Fishe, 2000; Field & Hanka, 2001; Ritter & Welch, 2002; Zheng & Li, 2008). Of these three phenomena, in my opinion, underpricing and underperformance should be considered as the drivers of flipping activities, for two reasons. First, underpricing creates a large amount of wealth in a short period of time because stock prices in the secondary market are significantly higher than the initial prices, especially for IPO shares with considerable underpricing. This rapid surge of wealth encourages investors to sell the IPO shares and realize the gains. Hence, flipping activities occur due to the urge to realize gains. Second, underperformance leads to the decline in long-term stock prices, and such declines provoke fear among IPO shareholders and make them reluctant to hold IPO shares for long. Hence, flipping activities occur due to the fear of future loss. Moreover, they can be understood to be driven by the basic IPO phenomena, underpricing and underperformance, which affect IPO performance in both the short and long term. As a result, this dissertation will focus on the IPO phenomena of underpricing and underperformance. On the one hand, how issuers, underwriters and investors contribute to underpricing and underperformance during the IPO process will be discussed in Chapters 3, 4, and 5, respectively; on the other hand,

these phenomena will be further explained from both the financial and psychological perspectives throughout this dissertation.

4.1 Short-term underpricing

IPO underpricing describes the phenomenon whereby the short-term return on IPO shares, especially the first-day return, is generally positive (Ibbotson, 1975). The first-day return, which is calculated as the percentage change between the closing price on the initial date and the initial price, is the most frequently used method for measuring the extent of underpricing (Loughran & McDonald, 2013). The underpricing phenomenon was first documented in 1970, where the appearance of underpricing was reported as taking place in a “systematic fashion” (p. 320) among newly issued shares (Stoll & Curley, 1970). Thereafter, underpricing became increasingly pronounced and reached its peak during the internet bubble (1999 to 2000). Specifically, from 1998 to 2000, the average first-day return in a sample of 389 U.S. IPO companies was 81.85 percent (Ritter & Welch, 2002). From 1986 to 2003, which covers the internet bubble, the average first-day return in a sample of 797 U.S. IPO companies was 46.2 percent (Cai, Lee, & Valero, 2010). 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, 2014c). One of the canonical examples of underpricing is the case of Netscape Communication Corp. Within 18 months of founding the company, the top executives conducted an IPO on 9 August, 1995 at a price of \$28 per share. On that same day, the closing price was \$58 per share, yielding a first-day return of 107 percent

(DeLong & Magin, 2006).

Underpricing might have several side effects on the newly issued shares and thus on the issuing companies. Speculators from both inside and outside the company are highly likely to flip the initial shares. The term *flip*, sometimes also referred as *spin*, 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). In the case of Netscape, flipping or spinning would be initial stockholders selling the shares, which they received before the initial day (August 9, 1995), shortly after Netscape went public. Instances with such high first-day returns are typically observed when the prices of the shares increase rapidly. For the initial shareholders of IPOs, a high first-day return 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. Details on information cascades and herd behaviors among investors will be further discussed in Chapter 5.

4.2 Long-term underperformance

Long-term underperformance indicates that IPO shares tend to exhibit worse performance relative to non-IPO shares in the long term (P. Schultz, 2003). Loughran and Ritter (1995) documented the poor performance of IPO companies from 1970 to 1990, with a 5-percent average annual return 5 years after an IPO. Holding all other factors constant, an equal investment in non-IPO companies would generate an average compound annual return of 12 percent. Another example of the underperformance phenomenon is that a three-year investment in IPOs at the end of the initial date would leave an investor 83 cents on the dollar, relative to what he or she would have earned by investing in a group of matching non-IPO firms over the same period of time (Ritter, 1991). Scholars have attempted to explain underperformance from various perspectives. Brav and Gompers (1997) argued that underperformance is not specifically an IPO effect but also exists in *seasoned equity offerings (SEOs)*, or *secondary equity offerings*, which are offerings issued by already publicly owned companies (Marquardt &

Wiedman, 1998; Mola & Loughran, 2004; Spiess & Affleck-Graves, 1995).

One of the explanations for underperformance is that it results from asymmetric information and irrational investors; low-quality firms exploit the hot issue market created by high-quality IPO firms, as previously stated (Ritter, 1991). Brav and Gompers (1997) provided other empirical evidence for underperformance, reporting IPOs that supported by venture capitalists did not significantly underperform; in contrast, small IPOs that were not supported by venture capitalists generally experienced significant underperformance. Details of this study will be discussed in Subchapter 1.1.1 of Chapter 5, which introduces the role of venture capitalists.

Other explanations of underperformance have also been offered. For instance, frequent acquisitions have been regarded as a reason for long-term underperformance (Brau et al., 2012). Interestingly, Gompers and Lerner (2003) argued that observations of underperformance were due to differences in calculation methods. They stated that underperformance was no longer observed when using cumulative abnormal returns instead of event-time buy-and-hold abnormal returns, suggesting that underperformance is potentially an artifact of calculation, rather than a fact.

To conclude, the primary contribution of this chapter was to introduce basic concepts involved in public equity funding and IPO issuance. It began with a general introduction to the methods used to raising public equity, which include IPOs, DPOs and RMs. It also described the reasons for raising public equity through IPO from the perspectives of capital structure, acquisition and insider group interest. Then, the IPO process was presented together with the lockup period, after which the two key IPO

phenomena were discussed.

When companies consider financing in general, especially through an IPO, the decision-making process they employ is described by the flowchart in Figure 3, which also depicts the main structure of this chapter. The next chapter will present further analysis on the interplay among the three main parties involved in IPOs from the finance perspective. Specifically, it will introduce concepts from agency theory; it will analyze the interests of issuers, underwriters, and investors and their impact on IPO phenomena; and, finally the asymmetric information among these three parties will be explained.

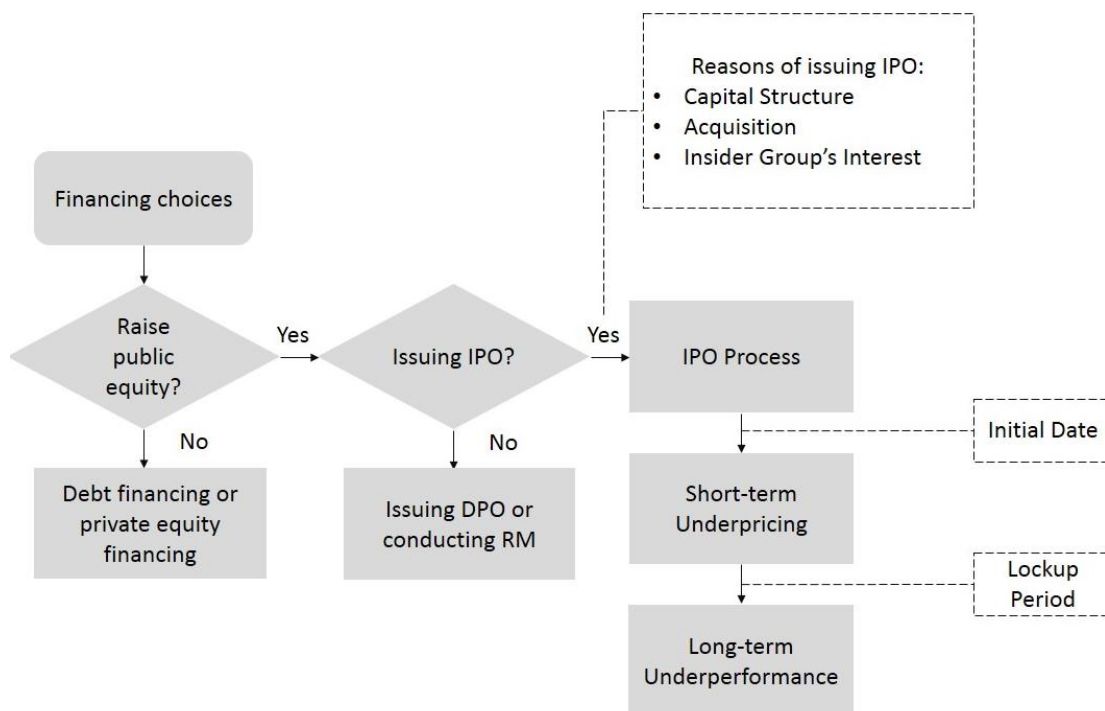


Figure 3 General decision making process of financing.

Chapter 2 The interplay of parties involved in IPOs

As stated in Chapter 1, the entire IPO process involves three parties, namely, issuers, underwriters and investors (Ljungqvist, Nanda, et al., 2006). These parties not only act separately but also interact with one another in different phases of the IPO process, especially in the stage around the initial date, i.e., in the short term of the IPO (Ritter & Welch, 2002). The mechanism describing the interplay among these parties aligns with agency theory and can be specifically explained by multiple agency theory (Arthurs, Hoskisson, Busenitz, & Johnson, 2008). In this chapter, traditional agency theory will be first explained as the theoretical basis, and multiple agency relationship will be then discussed together with the IPO process. Second, the interests of different parties will be described to allow for further interpretation. Third, the asymmetric information between these parties, which is believed to be one of the important factors influencing certain IPO phenomena, such as underpricing (Muscarella & Vetsuypens, 1989), will be elaborated. The overall 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. Such clarifications are also necessary to further understand IPO phenomena.

1. Agency Theory in IPOs

In an initial public offering process, different parties are involved in various agency relationships. For instance, the underwriter, on the one hand, can be the agency of issuers while issuing new shares, and on the other hand, can be the agency of

institutional investors while distributing new shares (Arthurs et al., 2008; Kosnik & Shapiro, 1997). It is necessary to disentangle all the possible agency relationships in order to analyze the interplay between the three parties, and to interpret their further influence on the IPO process and specific IPO short-term phenomena.

1.1 Traditional agency theory

An agency relationship is defined as a contract involving an agent making decisions on behalf of a principal in a specific domain (Jensen & Meckling, 1979; S. A. Ross, 1973). When both parties in an agency relationship, namely the agent and principal, have the tendency to maximize their own utilities, divergences between the agent's behavior and the principal's best interests arise, thereby generating agency problems and conflicts (Edelen, Evans, & Kadlec, 2012; Wright & Ferris, 1997). Specifically, in the capital market, it is believed that the portfolio owners' (principals') investment risk can be hedged by investing in diversified firms (Fama, 1980). However, when the portfolios reach certain sizes, it becomes challenging for the owners to monitor each company in which they have invested. As a result, for the owners to manage their companies or portfolios effectively, modern corporate management requires a separation between control and ownership (Fama & Jensen, 1983). A direct consequence of this separation is that professional managers (agents) control and manage the company instead of its owners. This might lead to situations in which conflicts of interest arise between managers and owners, namely, where managers tend to use their authority to maximize their personal benefits, instead of those of owners.

For instance, a CEO (agent) might try to avoid a merger in order to secure his or her own position, while the merger is in the shareholder (principal)'s best interest (Beatty & Zajac, 1994; Walsh & Seward, 1990).

A traditional agency relationship typically consists of one agent and one principal, and conflicts of interest only exist between these two roles (Eisenhardt, 1989). While this relationship forms the basis of the principal-agent model, the development and growth of modern corporations means that a one-to-one agency relationship no longer accurately describes real-world situations. Many more parties are now involved, especially when the company is in its initial public phase (Bruton et al., 2010).

The following subchapter discusses the role of different agents in an initial public offering from the perspective of multiple agency theory, in conjunction with their influence on specific IPO phenomena such as underpricing.

1.2 Multiple agency theory

Board of directors are recruited by the owners to monitor top managers and to protect owners' interests. In other words, the basic function of the board is to ensure that all significant decisions made by top management are intended to maximize the owners' interests, in other words, to manage the company effectively and efficiently according to the corporate visions and long-term goals (Fama, 1980). Thus, theoretically the board should be structured in various ways when companies are in different phases of their lifespans. In the case of initial public offerings, due to its complex process and frequent interactions with the outside market, to ensure adequate

monitoring throughout the process, it is reasonable to include relevant outsiders in the board of directors, in addition to the inside board members. As a result, the relevant outsiders who play significant roles in the IPO process and thus might be involved in the board according to the existing literature are summed as follow: 1) outside directors, who are independent of the competition among firms' top managers and thus can be regarded as professional referees (Fama, 1980; Fama & Jensen, 1983); 2) outside stockholders, whose conscientiousness in monitoring the firm is presumably positively related to the size of their equity stakes (Morck, Shleifer, & Vishny, 1988); 3) venture capitalists, who offer the capital to support the IPO and whose interests are aligned with the firm's performance in the short term, and thus tend to be vigilant in monitoring (Beatty & Zajac, 1994); and 4) underwriters, whose interests are also aligned with IPO companies' performance in the short term and hence the same argument regarding vigilance can be extended as well (Arthurs et al., 2008). Additionally, separating the roles of CEO and chairman of the board is considered as the most important method to enhance the board's power with respect to the top management team and thereby deliver improved firm performance (Lorsch & Young, 1990). When all of the abovementioned parties, whose interests occasionally conflict, are represented on the board, more than one principal and agent is involved in the initial public offering process, and thus a more complex agency relationship arises (Arthurs et al., 2008; Bruton et al., 2010; Filatotchev & Bishop, 2002).

This type of agency relationship, which differs from traditional agency theory that only considers one principal and agent, can be examined using multiple agency theory

(Arthurs et al., 2008). Multiple agency theory illustrates that different ownership constituents (principals) have different types of interests, which lead to various decision orientations among the different parties on the board (Hoskisson, Hitt, Johnson, & Grossman, 2002). Specifically, in the case of initial public offerings, these diverse parties (agencies) can be underwriters, venture capitalists and issuers. In the following sections, various interests, decision orientations and the potential interest conflicts of these parties will be explained.

2. Interests of Parties and Their Effects on Short-Term IPO Phenomena

As stated above, issuers, underwriters and investors are all involved in the IPO process, and potential conflicts of interest might occur during different phases in the process. For instance, one of the most frequently studied IPO phenomena is underpricing, as stated in Chapter 1. Among the three parties, underwriters might intentionally set a lower initial price to compensate their preferred institutional investors; however, theoretically, such underpricing might be detrimental to the interests of issuers because if the shares had been normally priced, they would have raised more capital or fewer shares could have been issued (Barry, 1989; DuCharme et al., 2001). Another example is flipping activities, which, on the one hand, are beneficial to investors who sell shares shortly after the initial date; however, on the other hand, excessive flipping activities might cause constant price declines due to an information cascade, which is detrimental to issuer's interests (R. Aggarwal, 2003; Bikhchandani et al., 1992). The three parties' interests have the strongest interactions around the initial

date, i.e., in the short term after the IPO. As a result, in this subchapter, underpricing, together with its effect, namely, flipping activities, will be explained as the main IPO phenomena, from the perspective of the respective interests of issuers, underwriters and investors, and the possible agency conflicts among these roles will be analyzed.

2.1 Issuers' interests

As stated in Chapter 1, there are several reasons for issuers to raise public equity. In my opinion, issuers with various reasons for going public may also differ in their focal interests. For instance, for issuers seeking to readjust the capital structure, their focal interest would be selling all the initial shares and raising the total amount of equity they need; issuers seeking to merge with and acquire other firms after the IPO would avoid having their control being severely diluted by IPO and thus not issue more shares than necessary (Chahine, 2008; Smart & Zutter, 2003). As a result, these different focuses can lead to different interests on the part of issuers and might lead to different reactions to a given phenomenon. In the following, underpricing and flipping will be explained based on issuers' interests according to both the psychological and financial disciplines.

2.1.1 Underpricing from the issuers' perspective.

When the underpricing phenomenon is viewed from the issuers' perspective, it can be vividly referred to as a situation in which issuers "leave money on the table" (Loughran & Ritter, 2002, p. 413). The amount of underpricing is typically significant

and thus should be considered as an indirect cost of the IPO (Ritter, 2014c). For instance, companies that went public between 1990 and 1998 underpriced their initial shares by \$27 billion, which is twice as much as the \$13 billion in fees paid to underwriters and three times as much as the \$8 billion in profit they had generated in the fiscal year before the IPO (Loughran & Ritter, 2002). Based on the economic interests of issuers, issuers who wish to maintain control of the firm would like to raise as much capital as possible, or avoid issuing more shares than necessary, to prevent their ownership from being diluted (Alavi et al., 2008; Cheffins, 2008). As underwriters are typically the group that suggests initial prices, it appears reasonable that after an IPO with a substantial amount of underpricing, issuers will attempt to avoid further cooperation with such underwriters that had significantly underestimated the value of their initial shares. However, an interesting finding by Krigman, Shaw, and Womack (2001) indicated that issuers actually preferred a large amount of underpricing. They 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; they used first-day returns to measure the level of underpricing. As previously stated, first-day returns are defined as the percentage change from the offering price to the closing price on the initial day (Loughran & McDonald, 2013), thus the larger this value is, the greater the extent of underpricing is, and the more money is left on the table. 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. When making decisions under risk, individuals are more likely to exhibit a series of specified behaviors that cannot be explained by the traditional utility theory, such as the certainty effect or reference point effect (Kahneman & Tversky, 1979; Shefrin & Statman, 1985; Tversky & Kahneman, 1991).

The certainty effect describes the observation that individuals generally overweight outcomes that will occur with certainty. This effect was first observed in an experiment conducted by Maurice Allais in 1952 and was subsequently known as the *Allais Paradox* (MacCrimmon & Larsson, 1979). Applied to the case of underpricing, issuers are aware from historical experience of other IPOs that greater underpricing generally results in greater demand for new issues, and thus a relatively low offering price will likely guarantee that all of a new issue will be sold and all the funding the issuer requires will be successfully raised. Specifically, issuers take selling all the shares as the certain outcome, and the amount of underpricing as the uncertain outcome because the amount of money left on the table will remain unclear until the end of the initial day. As a result, in accordance with the certainty effect, issuers are likely to pursue the certain outcome at the expense of uncertain outcomes. In other words, issuers would like to sell all of the shares regardless of the amount of underpricing.

The reference point is derived from prospect theory. In short, it is a point above

which people become risk adverse and below which people become risk seeking (Tversky & Kahneman, 1991). A comprehensive literature review on the reference point can be found in Baucells, Weber, and Welfens (2011). In the case of an IPO, issuers will announce an initial price range before the shares go public, stating the price range at which they want to sell their initial shares (U.S. Securities and Exchange Commission, 2015c). As a result, it is reasonable to assume that the reference point of issuers is a price within the initial price range. As argued by Loughran and Ritter (2002), the reference point for issuers is more likely to be the median of the initial price range than the historical cost of issuance. When a share is underpriced, it means that the stock price after the initial date will be above the reference point; for shares with a negative first-day return, it means that the price will drop below the reference point and issuers will be strongly loss-averse. Furthermore, they argued, using a different insight from prospect theory, that when two related outcomes occur, people tend to treat them as one, as Tversky and Kahneman (1992) proposed in their *cumulative prospect theory*.

Cumulative prospect theory not only explains why the same amount of losses and gains trigger different levels of emotional response but also might explain a different aspect of issuers' opinions of underpricing. Specifically, in the case of IPO underpricing, issuers tend to combine two outcomes: the first outcome is the bad outcome whereby control is diluted to a small extent (due to underpricing, more shares are issued than necessary); the second outcome is the good outcome whereby the net worth of the company increased to a large extent (due to the increased stock price). As a result, after combining these two outcomes, issuers perceive underpricing as a good outcome and

are pleased by it (Loughran & Ritter, 2002).

To conclude, underpricing can benefit issuers psychologically, and for those issuers who hold a certain amount of initial shares, underpricing can also benefit them monetarily. However, what the extent of underpricing should be and how to constrain the amount of underpricing within a reasonable range represent core issues that need to be addressed. Although, on the one hand complaints about underwriters can be filed with the SEC when the initial offering price set by underwriters is too low relative to the opening market price, it remains possible that underwriters will exploit their superior information and recommend an issuing price that includes an excessive amount of underpricing (Baron & Holmström, 1980); on the other hand, it appears that issuers are not strongly opposed to substantial underpricing as one would reasonably assume (Krigman et al., 2001; Loughran & Ritter, 2002). To ensure that the extent of underpricing is moderate, issuers should not only monitor stock market information but also separate these two outcomes, namely, perceive good news and bad news separately.

2.1.2 Flipping activity from the issuers' perspective.

Flipping activity, also known as spinning activity, as stated in Chapter 1, describes a phenomenon whereby initial investors sell IPO shares shortly after the initial date (Bayley, Lee, & Walter, 2006; X. Liu & Ritter, 2010; Maynard, 2001). There are two main questions related to flipping activities after the initial date in the IPO context. First, are investors more likely to flip favorable shares, i.e., shares with a high first-day return, or do they prefer to flip unfavorable shares, i.e., shares with little, zero or negative first-

day return? Second, do IPO shares benefit from flipping activities? If they do, to what extent?

Regarding the first question, the extent of flipping activities differs between hot IPOs and cold IPOs, where hot IPOs have a considerable first-day return, i.e., are severely underpriced, and cold IPOs have a low or nearly zero first-day return, i.e., they are underpriced to a small extent (Ibbotson & Jaffe, 1975). For instance, R. Aggarwal (2003) categorized her IPO sample into *very cold*, *cold*, *warm* and *very hot* IPOs. For very cold IPOs, the average first day return is zero or less; for cold IPOs, the average first day return is between zero and 10 percent; warm IPOs' first day return is between 10 percent and 60 percent, and the very hot IPOs have an average first day return above 60 percent. Distinguishing between hot IPOs and cold IPOs helps to differentiate favorable IPOs from unfavorable IPOs; doing so is useful because scholars have different opinions regarding whether hot or cold IPOs are flipped more frequently. Some studies have argued that cold IPOs are flipped faster by institutional investors because shortly after the initial date, the stock price remains relatively high for the reason that most underwriters will be the market maker when IPOs are cold and maintain a high price level by purchasing back the shares and making the market (Ellis, Michaely, & O'Hara, 2000; P. H. Schultz & Zaman, 1994). Other studies have argued that hot IPOs are flipped more often when the frequency of flipping activity is measured as the shares flipped as a percentage of shares offered; the flipping frequency of cold IPOs seemed higher when it is measured by shares flipped as a percentage of trading volume. The argument of these studies is that the reason for this finding is not simply

that cold IPOs are flipped substantially more frequently than hot IPOs; rather, cold IPOs have very little trading volume compared with hot IPOs (R. Aggarwal, 2003; Krigman, Shaw, & Womack, 1999). For instance, R. Aggarwal (2003) showed that, for very hot IPOs, warm IPOs, cold IPOs and very cold IPOs, the average shares flipped as a percentage of trading volume is approximately 15 percent, 17 percent, 19 percent and 21 percent, respectively. However, the average shares flipped as a percentage of the shares offered is approximately 10 percent for very cold IPOs and 30 percent for very hot IPOs. Her study suggested that the flipping frequency is a relative concept that produced various results depending on the factors to which the shares flipped were compared.

A simplified example based on the result of R. Aggarwal (2003) can be made concerning the two broad types of IPOs: Firm A issued 100 initial shares, which turned out to be a hot issue after the initial date; Firm B also issued 100 initial shares, which turned out to be a cold issue after the initial date. Shortly after the initial date, initial shareholders of Firm A flipped a total of 30 shares, which were traded 10 times during a given period. Over the same period of time, initial shareholders of Firm B flipped a total of 15 shares, which were traded 2 times. As a result, for Firm A, the shares flipped as a percentage of trading volume is $30 / (30 * 10) = 30$ percent, while the shares flipped as a percentage of the shares offered is $30 / 100 = 30$ percent. For firm B, the shares flipped as a percentage of trading volume is $15 / (15 * 2) = 50$ percent, while the shares flipped a percentage of the shares offered is $15 / 100 = 15$ percent. As a result, in my opinion, a direct conclusion concerning whether high flipping frequency is associated

with favorable IPOs or whether favorable IPOs are associated with high flipping frequency might be misleading. To state the question clearly, in this section, shareholders who are allocated IPO shares before the initial date are defined as *initial market shareholders*, and shareholders who purchase the shares after the initial date on the secondary stock market are defined as *aftermarket shareholders*. Based on the previously mentioned results, it is the case that, for hot IPO shares, initial market shareholders flip a larger number of initial shares.

Thus, an interesting question can be proposed: do hot IPOs create a high volume of flipping activity by initial market shareholders, or does the high amount of flipping activities by initial market shareholders create hot IPOs? This question concerns the same central issue as the second question proposed at the beginning of this section: how much do issuers and IPOs benefit from flipping activity?

Several studies report that flipping activities by the initial market shareholders help to create liquidity in the secondary market and encourage price discovery for IPOs (R. Aggarwal, 2003; Fische, 2002; Krigman et al., 1999). Intuitively, in an extreme situation in which no shares will be sold by the initial shareholders immediately after the initial date, i.e., when no flipping activities occur, there would be no shares available for trading in the secondary market, and thus no underpricing will occur. This would lead to a cold IPO. In addition to the disadvantages of cold IPOs stated above, Krigman et al. (1999) found that one year after the initial date, cold IPOs continued to be perceived as unfavorable by investors, while they continue to regard hot IPOs as favorable. The authors also stated that flipping activity was a natural reaction to the

underpriced IPOs and that poor IPO performance is not a result of flipping. However, other scholars, institutional investors and underwriters have offered numerous critiques of flipping activity and flippers for creating the unstable market prices for IPOs (Carter & Dark, 1993; Maher, 1990; Stojkovic, 2015). For instance, Stojkovic (2015) argued that from 1986 to 2013, the average issuer losses from flipping activities equaled \$4.8 million; Carter and Dark (1993) argued that the price performance of IPOs after the initial date is negatively correlated with trading volume, suggesting that flipping activities are detrimental to IPO performance in the secondary market.

In my opinion, as R. Aggarwal (2003) noted, trading volume does not necessarily reflect the amount of flipping activity. Trading volume should be positively correlated with the popularity of an IPO, rather than how extensively it has been flipped (Kaustia, 2004; Krigman et al., 1999). From the market perspective, flipping activities increase the shares' liquidity, and high liquidity will in turn increase transaction costs (Amihud & Mendelson, 1991). Thus, several studies have noted that frequent traders who execute multiple trades per day tend to lose in the stock market in the long run due to factors such as the high amount of transaction fees and taxes they have to pay or to cognitive biases (over confidence, loss-aversion, etc.) (Barber & Odean, 2000; S. S. Lim, 2006). Details on frequent trading behavior from the investor perspective will be discussed in Chapter 5. From the issuers' perspective, summarizing the above, moderate flipping activities create liquidity, help to develop the market price, increase the popularity of IPOs and provide other investors with the opportunity to purchase initial shares (R. Aggarwal, 2003; Krigman et al., 1999). However, when the flipping activity exceeds a

certain limit and becomes excessive, in other words, when there are too many flippers in the market and the amount of flipped shares exceeds the market's capacity to absorb them, flipping activity will have a detrimental effecting, leading to poor stock price performance one year after the initial date, considerable capital loss, and other negative effects (Krigman et al., 1999; Stojkovic, 2015).

As a result, it is possible that flipping activity has a reciprocal causal relationship with the popularity of an IPO, and from the perspective of the issuers' interests, flipping activity can be beneficial as long as the volume of flipped shares is moderate.

2.2 Underwriters' interests

As stated in Chapter 1, underwriters are professional organizations that help issuers to sell their new shares in the stock market (L. H. Fang, 2005). In this subchapter, underpricing as the representative short-term IPO phenomenon will be discussed from underwriters' perspective. Flipping activities will not be listed separately because in the secondary market, underwriters' interests become similar to those of institutional investors and thus can be represented by either speculative or non-speculative institutional investors, which will be discussed in Subchapter 2.3.

Generally, one of two types of deals is made in the contract between underwriters and issuers: a firm commitment deal or a best effort deal (Baron, 1982). The former describes a situation in which underwriters purchase all of the initial shares from the issuers irrespective of whether all of the shares can be subsequently sold to the public. The latter describes a situation in which underwriters do not purchase all of the initial

shares; instead, they make their best effort to sell the shares to the public, and the unsold shares are then retained by the issuer (Jenkinson & Ljungqvist, 2001a). As the type of deals is determined before the initial public offering, it is typically difficult to predict whether there will be sufficient public purchasers of the initial shares. The effects of these two contract types on the underwriters can be interpreted in two perspectives: on the one hand, underwriters that select the firm commitment deal will take more risks than those who choose the best effort deal, and on the other hand, the firm commitment deal will provide underwriters with higher incentives to devote greater effort to advertising and selling the shares than the best effort deal (Logue, 1973).

In most cases, underwriters with high reputation will choose the firm commitment deal over the best effort deal (Arthurs et al., 2008). As a result, these underwriters have a strong tendency to intentionally encourage underpricing, which entails selling the new offerings at a lower price, primarily for the following three reasons.

First, the more underpriced a new offering is, the less likely undersubscribing is to occur. Undersubscribing describes a situation in which the demand from subscribers, namely public investors, falls below the supply of shares (Amihud, Hauser, & Kirsh, 2003). This situation might convey a signal to the market that the initial shares are of low quality and after-market performance might be poor (Agarwal, Liu, & Rhee, 2008). The most direct result of an undersubscription is that the initial shares become cold issues due to the lack of demand. In contrast to hot issues, cold issues, or cold IPOs as stated in Subchapter 2.1.2, are defined as initial shares for which the price has fallen below, remained the same, or slightly raised above the offering price in the after-market

(R. Aggarwal, 2003; Ibbotson & Jaffe, 1975). Thus, undersubscription results in high risk for underwriters who have the firm commitment deal with the issuers, in which case they must retain these unfavorable cold issues or offer those to institutional investors, which that usually purchase the majority of initial offerings, and with which the underwriters wish to maintain a long-term cooperative relationship. Relationship between institutional investors and underwriters will be first introduced in the next paragraph, and further details about institutional investors will be explained in Chapter 4. To conclude, underwriters are unlikely to retain the risk caused by possible undersubscription, which might either hurt their own interests, or the interests of their long-term strategically allied clients, i.e. the institutional investors. Thus, from the aspect of preventing undersubscription, underwriters are likely to set a relatively low price for the IPOs, i.e. underwriters tend to encourage underpricing (Ritter & Welch, 2002; Ruud, 1993).

Second, more extensive underpricing provides a larger payout to institutional investors, which are the long-term strategically allied clients of the underwriters, in other words, they are the principal in the agency relationship between underwriters and themselves (Ritter, 1987). Specifically, in most circumstances, the institutional investors are allocated with the initial shares from the underwriters before the issues become publicly available on the initial date. Data from R. Aggarwal (2003) showed that, on average, underwriters allocate nearly 82 percent of the shares to institutional investors in a sample of 617 IPOs, from May 1997 to June 1998. Because of their frequent underwriting business, it is important for underwriters to create their own

group of institutional investor clients whom they would like to develop a long-term cooperating relationships with (Sherman, 2000). The one-shot collaboration between underwriters and issuers is relatively temporary compared with the long-term agency relationship between underwriters and institutional investors. Although there is a possibility of further equity issuance from the issuers several years after the IPO, meaning that underwriters and issuers can cooperate more than once, such collaboration is relatively limited compared with the fact that issuers might need to cooperate with institutional investors multiple times each year due to the number of equity issuance projects in which the issuers are participating (Chemmanur, He, & Hu, 2009; Ljungqvist, Nanda, et al., 2006). As a consequence, it is reasonable to assume that underwriters have a stronger incentive to maximize the gains of institutional investors than those of their short-term clients, namely, the issuers. For an agent with multiple principals, in the event that the interests of these principals conflict, the agent typically chooses to protect the principal from which he or she can benefit the most (Jensen & Smith, 1985; Spiller, 1990). In the case of an IPO, underwriters will consequently choose institutional investors over issuers, and this may in turn undermine the underwriter's objectivity in determining a reasonable offering price and lead to direct underpricing (Pollock, 2004). One possible psychological explanation for underwriters favoring a given group of clients over another is the norm of self-interest, which motivates people to act and speak as though they focus more on their own material interest than they actually do (D. T. Miller, 1999).

Third, by underpricing shares, underwriters can increase their potential future

cooperation opportunities with issuers. As previously stated, according to prospect theory and reference point theory, issuers are not upset when their shares are underpriced; on the contrary, they tend to treat this as good news (Kahneman & Tversky, 1979; Loughran & Ritter, 2002; Tversky & Kahneman, 1991, 1992). Krigman et al. (2001) found that, in their sample, there are relatively few issuers that switched lead underwriters from their IPO issuance to subsequent equity issuances (seasoned public offerings), only 30 percent. Among these 30 percent, the IPOs of switchers were significantly less underpriced than those of non-switchers. Due to this interesting reaction on the part of issuers, underwriters have an incentive to underprice IPOs to secure further collaboration with issuers.

Besides these three drives for underwriters which are likely to encourage underpricing, an option which is called *overallotment option* might buffer the shares' price from too extreme raising or falling after the initial date (Jenkinson & Ljungqvist, 2001a). The overallotment option is also referred to as the *green shoe option*¹. In the U.S., it allows underwriters to purchase an additional 15 percent, which is the up-limit imposed by the National Association of Securities Dealers (NASD), 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 and make up for the short position they created due to the extra issuance. The purpose of such an option

¹ This name originated from the name of the company that first used this option, the "Green Shoe Manufacturing Company".

is to protect new issues from unstable stock prices. 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 or slightly above 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). Because the number of shares distributed to the primary investors is decided before the initial date, the overallotment option is likely to be employed before underwriters know how the market will react to the IPO. As a result, underwriters that have already sold a number of shares in excess of the issuance size will attempt to avoid excessive underpricing. For instance, 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. Details on the overallotment option will be provided in Chapter 4.

To conclude, the economic and non-economic incentives for underwriters encouraging underpricing seem stronger for preventing it, even though theoretically, preventing price volatility in the initial shares is one of the most critical functions

underwriters should exercise in their agency relationship with issuers. However, if underwriters value their own interests and those of their other principal, institutional investors, more than the interests of issuers, they will have the tendency to create underpricing and then flip. Fortunately, underwriters with good reputations tend to distribute shares to institutional investors that are less likely to engage in flipping activities (Carter, Dark, & Singh, 1998). Thus it is very important to select a prestigious underwriter that can perform its duties without bias, even in multiple agency relationships. Further details about underwriters' position in the IPO process will be discussed in Chapter 4.

2.3 Investors' interests

If defined in a broad sense, there are three types of investors involved in the IPO process. According to when they invest in an IPO, the first type of investors are those who support startup companies, i.e., the issuers, before the underwriters split the capital and distribute it into initial shares, which are sold to the primary investors. 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). 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, 2009b). 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). The following sections will present the interests of these three types of investors.

2.3.1 Venture capitalists' interests.

Venture capitalists generate profits by offering funding to private companies that are going public (Lerner, 1994a). Therefore, venture capitalists can be also considered as one party that is involved in a multiple agency relationship: on the one hand, they are the principals of the new issuing companies that they invested in; on the other hand, they are the agents of the principals that invest in their venture capital funds.

Venture capitalists' interests have changed over time. Studies from the 1980s reported that venture capitalists functioned not only as the capital provider for but also as the monitor of the IPO process and share similar interests with the issuers. For instance, samples from 1983 to 1987 showed that IPOs supported by venture capitalists were significantly less underpriced than other IPOs and that the cost of going public was less in the venture-capital-backed group (Megginson & Weiss, 1991). Another study using the sample from 1978 to 1987 showed similar results relating to the level of underpricing. Studies have also show that venture capitalists tend to maintain a certain amount of investment in the IPO firms in which they have invested (Barry, Muscarella, Peavy, & Vetsuypens, 1990). Specifically, using a sample of 433 IPOs from 1978 to 1987, Gompers (1996) showed that when comparing younger and older

venture capitalists, the former tend to encourage the companies they have invested in to go public earlier and with a greater amount of underpricing. Additionally, the younger venture capitalists tend to remain on the board of directors for a shorter period and hold smaller equity shares. Gompers reported that these results were caused by young venture capitalists' desire to create reputation and ensure that IPOs would be successful.

Indeed, at that time, venture capitalists can generate fast wealth in general. Data from P. W. Ross and Isenstein (1988) showed that, on average, every dollar invested by venture capitalists earns a net cash return of \$1.95, with an average holding period of 4.2 years (as cited in Lerner, 1994b). Compared with the 5-year interest rate of U.S. government bonds in 1990, which is approximately 8.2 percent (U.S. Department of the Treasury, 2015), generating a nearly 200 percent return over approximately 4 years' time is one of the fastest way to create wealth. In more recent years, the desire to rapidly generate wealth has attracted increasing attention from venture capitalists acting as the monitor of the IPO process. P. M. Lee and Wahal (2004) found that, the average first-day return changed significantly over the period from 1980 to 2000, especially during the internet bubble (1999 to 2000). Consequently, in their sample covering 20 years, venture-capital-backed IPOs tended to exhibit greater underpricing than IPOs that were not backed by venture capital. Their cross-sectional results showed that over the 20-year period considered, young venture capitalists' desire to establish their reputation also weakened. Higher underpricing in general creates a larger amount of future capital flows for venture capitalists, and this phenomenon became significantly stronger after

1996. This fast-paced public issuance, again, makes cooperation between issuers and venture capitalists transitory. Thus, venture capitalists have an incentive to affiliate with underwriters to create underpricing, as well as to flip, as they share a common interest (Arthurs et al., 2008). When the connection between underwriters and venture capitalists is sufficiently strong, there is potential for greater underpricing.

A general overview about the venture capitalists' development and changes of interests overtime can be found by the book from Gompers and Lerner (2004). They have provided supportive results about venture capitalists' intention to create rapid profit by showing that venture capitalists were likely to affiliate with underwriters in some circumstances, and that most venture capitalists were inclined to encourage companies to go public as early as possible to earn greater profits in a shorter time span.

2.3.2 Institutional investors' interests.

As previously stated, institutional investors can be representatives of the primary investors because underwriters tend to distribute most of the issuance to them (R. Aggarwal et al., 2002). The institutions indicated the term *institutional investors* manage large amounts of capital, such as pension funds, insurance companies, mutual funds, commercial banks and investment banks (B. S. Black & Coffee, 1994).

Officially, some underwriters have argued that the reason that they distribute such a large number of shares to institutional investors was because they had previously cooperated with these institutional investors, and previous experience showed that these institutional investors were less likely to flip, which helps to maintain a stable share

price in the secondary market (Carter et al., 1998). Indeed, Binay, Gatchev, and Pirinsky (2007) have found that underwriters are more likely to distribute shares to the institutional investors with whom they have previously cooperated in other IPO projects. However, one might then ask who is responsible for the substantial flipping of shares in the market if all the shares have been allocated to investors who do not flip. Interestingly, empirical evidence has suggested that institutional investors flip more frequently than do individual investors. For instance, R. Aggarwal (2003) found that, in her sample of 193 IPOs, over 70 percent of shares were allocated to institutional investors, and for the initial IPO prices within the filling range, institutional investors flipped approximately 8 percentage points more than did individual investors. However, when the initial prices were below or above the filling range, institutional investors flipped less, at approximately 3 percentage points and 8 percentage points less than individual investors, respectively. Thus, it is partially true that institutional investors flip less, especially when share price needs to be stabilized. Another study using an Australian sample of 419 IPOs showed that institutional investors were allocated an average of 76 percent of IPO shares and that approximately 93 percent of the total gains, i.e., the amount of money left on the table, in the first three days after the initial date was realized by institutional investors (Bayley et al., 2006). As a result, there is a large proportion of institutional investors that intend to flip IPOs and realize the gains shortly after the initial date. Such investors can be defined as *speculative investors*, whose aim with an investment is to make a fast profit, and their interests naturally encourage underwriters to engage in a larger amount of underpricing.

However, from another perspective, there are also *non-speculative investors* among institutional investors. One of the most frequently discussed topics in the fields of corporation management and law concerning institutional investors is whether they have excessive power on boards of directors (B. S. Black, 1991; Coffee, 1991). Some studies refer to the behavior and strong incentive of institutional investors to engage in cooperate governance as “activism” (Romano, 2001, p. 174; Ryan & Schneider, 2002, p. 554). This provides evidence that many institutional investors are prone to be real investors in IPO companies after the initial date, instead of flipping the initial shares and making a rapid profit off of them. The interests of non-speculative investors are more likely to be in line with those of issuers with respect to their attitude towards underpricing.

2.3.3 Individual investors’ interests.

Individual investors are regarded as the representatives of secondary market investors because most of them cannot participate in the primary allocation and the majority of them are trading actively in the secondary market after the initial date (Derrien, 2005; Charles Lee, Shleifer, & Thaler, 1991). Additionally, their interests are not specifically in line with those of any of the major parties addressed by multiple agency theory because they are independent individuals who represent their own interests.

In most contexts, the majority of individual investors are considered unsophisticated investors who are more likely to exhibit cognitive biases relative to

institutional investors or professional individual investors (Barber & Odean, 2008; Dhar & Zhu, 2002; Lakonishok & Maberly, 1990). For instance, consider the *weekend effect*, whereby the average return in the stock market is negative on Mondays and positive on the other four days of the week (French, 1980). Lakonishok and Maberly (1990) found this effect to be partly correlated with individual investors' active trading behaviors on Mondays in a study focusing on the trading patterns of individual and institutional investors. Additionally, in their study, individual investors were found to be more likely to execute sell transactions than purchase transactions among the active trades taking place on Mondays.

Interestingly, individual investors exhibit stronger stock purchasing rather than selling behavior on other occasions, which is caused by the attention-driven effect. Results obtained by comparing the stock purchasing behaviors of institutional and individual investors showed that individual investors were more likely to be driven by attention-grabbing stocks and become net buyers of them, due to the difficulty of searching for the numerous potentially purchasable types of stocks. These "attention-grabbing stocks" (p. 786) include those that have released positive news, abnormally large trading volume, or abnormal high one-day return (Barber & Odean, 2008). Given these conditions, IPOs, especially hot IPOs, can be considered a type of attention-grabbing stocks because their characteristics fit all the three criteria: frequently in the news and a large amount of underpricing, which leads to both abnormal trading volume and first-day return. Derrien (2005) offered both theoretical and empirical support for this. His model first suggested that although IPOs were overpriced compared to their

intrinsic value, they were still likely to have high initial return, i.e., a high level of underpricing, in markets when the demand from individual investors was amplified by information in the secondary market. His empirical data supporting this model showed that the aggregate demand of individual investors resulted in high stock prices in the secondary market, high underpricing, high first-day return, and poor long-term performance. This attention-driven effect is consequently one of the factors that can cause underpricing in the secondary IPO market, especially when a large number of individual investors are net-buyers after the high first-day return.

Additionally, cognitive factors tend to influence professional and non-professional individual investors to different extents. For instance, the disposition effect, which is a typical bias exhibited by investors whereby they tend to sell winning stocks too early and hold losing stocks for too long, was found to be significantly less common among individuals who hold large amounts of capital and individuals who work as professionals (Dhar & Zhu, 2002; Weber & Camerer, 1998). In addition to cognitive factors, affective factors and social factors also affect individual investors' trading behaviors, especially non-professionals trading in the secondary market, the details of which will be provided in Chapter 5.

To conclude, multiple agency theory can represent the complex principal-agent relationships among the three parties, including their conflicts of interest and different preferences concerning two short-term IPO phenomena, underpricing and flipping (Figure 4). Furthermore, based on the possible conflicts of interest among the various parties throughout the IPO process, it is possible to offer practical suggestions regarding

the structure of the board of directors. In my opinion, according to multiple agency theory, it is reasonable to have more inside board members than outsiders, or to have more parties whose interests are in line with the insiders, which is contrary to traditional agency theory. Such a board composition is especially necessary during the initial public offering process, when most outside board members (underwriters, most current venture capitalists and speculative institutional investors) have an incentive to encourage selling the IPO shares at a low price by encouraging underpricing. Inside board members, some venture capitalists, and non-speculative institutional investors are more committed to the goal of companies' long-term development, similar to the goal of the companies' shareholders, than the outsiders are. Such different focus of interests may result in insiders having greater incentives to protect the interests of the shareholders. Additionally, inside board members' psychological ownership of the company also motivates them to devote greater effort, loyalty and commitment to their companies (Avey, Avolio, Crossley, & Luthans, 2009; Cardon, Zietsma, Saporito, Matherne, & Davis, 2005; Pierce, Kostova, & Dirks, 2001).

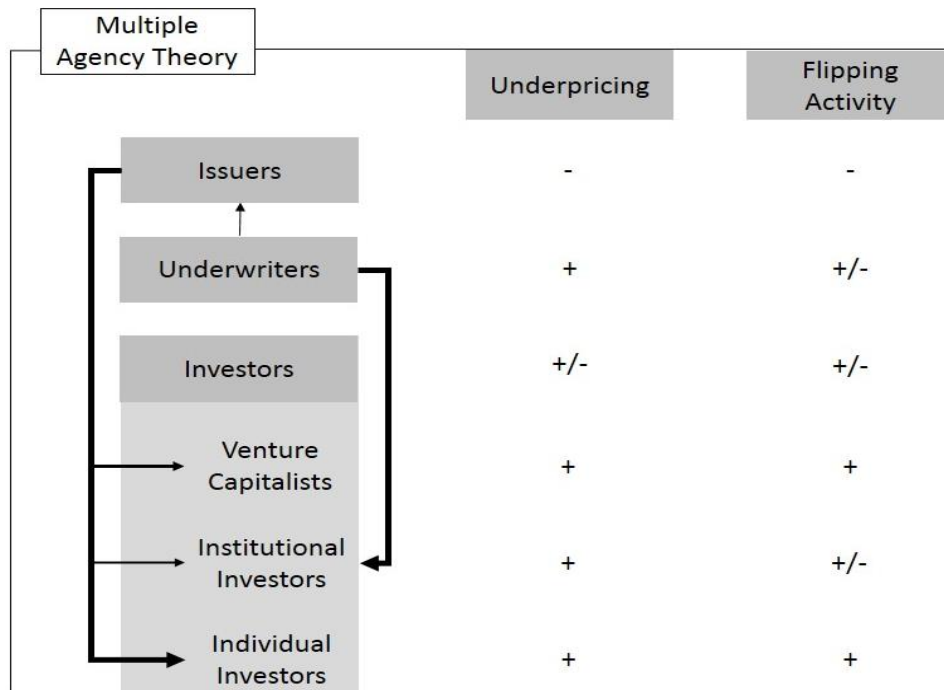


Figure 4 *The interplay of parties involved in the IPO process and their preferences concerning underpricing and flipping. On the left-hand side, one arrow represents one principal-agent relationship, where the arrow always points to the principal. The boldness of the arrow represents the typical duration of time of such a principal-agent relationship. For instance, the arrow between issuers and underwriters is the least bold, which indicates that the relationship between them lasts for the shortest period of all the principal-agent relationships considered here. On the right-hand side, the pluses and minuses indicate the parties' general preferences regarding underpricing and flipping activities. For instance, the two minuses in the first row describing issuers show that issuers generally do not favor underpricing or flipping activity.*

3. Asymmetric Information Between Parties and Its Effects on IPO Phenomena

According to the attempts to disentangle the diverse conflicts of interest between different principals presented above, it appears that during initial public offerings, issuers that represent companies' true interests are in the weakest bargaining position, relative to underwriters, most of the current venture capitalists and speculative institutional investors. Theoretically, issuers can also go public without the assistance of underwriters (see Chapter 1). In this case, issuers have to set the initial price and distribute the new shares on their own, regardless of underwriters' opinions. Is this

approach preferable to hiring an underwriter? To answer this question, it is first necessary to clarify the possible asymmetric information between issuers and underwriters and that between issuers and investors.

3.1 Asymmetric information between issuers and underwriters

The current literature primarily focuses on the situation in which underwriters have superior information relative to issuers (Baron & Holmström, 1980; Benveniste & Spindt, 1989; Chemmanur & Fulghieri, 1994). This situation arises from the following three sequential service items that the underwriter provides in an initial public offering process: managing (consulting), underwriting, and selling (distributing), which are also known as the three functions of underwriters (Baron & Holmström, 1980; Torstila, 2001). The managing or the consulting function involves advising on general questions regarding the IPO process, recruiting other investment banks to join the underwriter syndicate, and managing the collaboration among various underwriters in the syndicate (Ritter & Welch, 2002; Torstila, 2001). The underwriting function involves assisting issuers in determining the important factors of an initial issue, such as the timing, the approximate amount and price range of the new shares, filling forms and preparing documents for regulators to approve the IPO, sharing some or all of the issuing risk with issuers (see best effort contract and firm commitment contract), and developing information that might benefit issuers' corporate governance in the long term (R. Aggarwal & Conroy, 2000; Dong, Michel, & Pandes, 2011; Hanley & Hoberg, 2010). The selling or distributing function primarily involves a set of activities relating to

selling part or all of the new issues, such as releasing affiliated analysts' recommendations and forecasts, conducting road shows, book building, share allocation and market making, and all of these activities are performed by underwriters to sell shares to certain investors and stabilize the share price in the secondary market (Cornelli & Goldreich, 2003; Ellis et al., 2000; Gondat - Larralde & James, 2008). All of the three different functions will be introduced in Chapter 4, where the underwriter syndicate is divided into three groups: the management group, underwriting group and selling group; thus details on this topic will not be provided here.

As a result, according to these functions, the asymmetric information between issuers and underwriters can take the following forms: 1) for what reasons some institutional investors are invited in the roadshow process are unclear to the issuers, or 2) investors' demand and willingness to pay for the new issues in the book-building process is unclear to the issuers, or 3) the specific investors who will receive the new issues from the underwriter in the distribution process and whether they will engage in flipping activities in the after-market are unknown to the issuers (Baron & Holmström, 1980; Benveniste & Spindt, 1989).

As reviewed in the previous subchapter, the most commonly known contracts between underwriters and issuers are the *firm commitment contract* and *best effort contract* (Dunbar, 1998). Under the former type of contract, underwriters bear all of the issuing risk, and under the latter type, issuers and underwriters share the issuing risk. This distinction places particular emphasis on the role of risk sharing in the underwriters' process of executing their functions. However, when specifically considering

underwriters' selling or distributing function, there is another way to distinguish such contracts between issuers and underwriters: based on whether it is necessary for the underwriters to distribute the new shares, these contracts can be categorized into *direct sale* contracts and *pure distribution* contracts (Baron, 1982). According to Baron (1982), in a direct sale contract, issuers alone determine the issuing price, distribute the shares without the assistance of underwriters, and underwriters only share the risks when selling the shares. In other words, in this type of contract, the underwriter only plays part of the selling role, which is the share allocation and market making parts. In a pure distribution contract, issuers also set the issuing price, but the underwriters assist them with distributing and selling the shares, meaning that the underwriter performs all the parts from both the underwriting and distributing functions.

Based on the degree of asymmetric information, Baron (1982) identifies the situations in which different types of contracts usually would be used:

When underwriters and issuers have identical stock market information, a firm commitment contract would be optimal for the issuers, as the issuers can determine the stock price as precisely as the underwriters; thus the best option is to transfer the issuing risk to underwriters. In this case, issuers only need underwriters for selling and arranging the distribution of the shares, i.e. share allocation and market making from the selling function.

When issuers have limited information with which to establish the stock price, they should consult the underwriters to determine the optimal price. In such a situation, underwriters typically require compensation for providing information. Underwriters

typically create such compensation in the form of underpricing, by suggesting a lower share price than the real value of the shares. In the model provided by Baron (1982), the more precise the issuers wish the information to be, the more compensation they should pay, and thus the more underpricing there will be.

When issuers lack both pricing and distribution information, they should not only secure the assistance of underwriters for distributing shares but also consult them about the initial price. In other words, an advanced distribution contract that includes consulting services should be adopted. In such cases, all three underwriting functions will be performed.

When the information is symmetric, there is no longer a need to hire an underwriter. In this respect, theory aligns well with reality; when underwriters or banks 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).

These four extreme situations provide support for why underwriters are necessary in the initial public offering process from the perspective of asymmetric information. Additionally, if one further examines the role of underwriters throughout the initial public offering process, the necessity of having an underwriter is also clear from a cost saving perspective.

As noted in Chapter 1, the process of going public is complex and time-consuming. For instance, in the U.S., the first step for underwriters is to prepare an extensive amount of paperwork to comply with SEC rules in order to get the approval about the IPO issuance (Hanley & Hoberg, 2010; U.S. Securities and Exchange Commission, 2015c).

Then, it is typical that underwriters set the initial price one day before the initial date and allocate the IPO shares to the primary investors shortly after that (Daily, Certo, & Dalton, 2005). During the period between these two occasions, underwriters primarily devote their effort to 1) affiliated analysts' forecasts and recommendations, which are allowed to be published after the approval of SEC, 2) market campaign, namely the roadshow, which introduces the companies to potential investors, 3) book-building, which collects information from the stock market, such as feedback from investors, analyzing the indicators of interest, set the price, and so forth (Cornelli & Goldreich, 2001; Lin & McNichols, 1998; Schulte & Spencer, 2000). Similarly, as stated previously, this intricate process requires professional knowledge and experience, and thus it would be costly and inefficient if issuers were to directly sell the new shares on the market without the assistance of underwriters.

The share allocation is the final step in the IPO process before the shares enter the secondary market, or the aftermarket, where the shares will be publicly tradable. Because IPOs are usually considered underpriced, especially in a hot issue market, institutional investors and some individual investors who have the opportunity to participate in the primary allocation are likely to create an oversubscription of the initial shares (Derrien, 2005; Ljungqvist, Nanda, et al., 2006). When shares are oversubscribed, one of the allocation methods is to distribute the shares according to the amount of shares the investors have applied for, meaning that investors can only obtain a part of the shares to which they subscribed (Parsons & Raviv, 1985). It has been noted that underwriters have their own distribution channel, and most of shares go to institutional

investors (R. Aggarwal, 2003). Consequently, who holds the shares to some extent determines the flipping activities in the secondary market, which is why this step is important to issuers. The literature indicates that underwriters with good reputations distribute shares to institutional investors that have a relatively low tendency to flip, and most important, they maintain positive cooperation relationship with these institutional investors (Carter et al., 1998).

In my opinion, identifying the non-speculative institutional investors and then attempting to access them might be overly time- and energy-consuming for issuers that wish to distribute the shares without the aid of underwriters. These challenging tasks expose issuers to the potential risk that the flipping activities might be too severe, and the loss from this might be more significant than the cost of hiring an underwriter.

As a result, from an economic perspective, it is always necessary to have an underwriter during an initial public offering process. For instance, statistics showed that the average number of managing underwriters in an IPO has been constantly raising from 1.4 to 6.4 during 1980 to 2014 (Ritter, 2014a). However, questions such as whether underwriters are the only actors who benefit from underpricing or what issuers will benefit from underpricing have been a topic of discussion in the extant literature. Thus, the underpricing phenomenon will be addressed from the issuer's perspective, underwriter's perspective and investor's perspective in the following chapters.

3.2 Asymmetric information between issuers and investors

Ritter and Welch (2002) suggested that the asymmetric information exists in two

forms: the issuer is more informed than the investor or vice versa.

When issuers possess more information on the qualities of the issuing companies, issuers of better-than-average quality are willing to sell the shares at a lower price, as this is their way differentiating themselves from the worse-than-average issuers, which usually sell shares at the normal price. This is because sound issuers can make up for their loss during the IPO from further issuing activities (Welch, 1989). As a result, this lower-than-average pricing strategy signals to the investors that these issuers are willing to leave money on the table because they are confident in the future of their own companies, which is one of the explanations for underpricing from the economic perspective.

When investors hold more information, they are more informed about the current market demand for new offerings than underwriters are. These informed investors need not constitute the majority of all investors but could be a small group of investors who have access to superior information than their peers (Benveniste & Spindt, 1989). Based on their superior information, these investors can clearly determine whether new issues are over- or underpriced. This case, on the one hand, causes issuers to face an allocation problem, as they are uncertain of the real demand in the market; on the other hand, this leads to a *winner's curse* or an *informational cascade* (Ritter & Welch, 2002). Specifically, if the shares are overpriced, only uninformed investors will purchase them. This triggers the *winner's curse*, stating that due to the oversubscription of hot IPOs, full allocation only exists in cold IPOs, whereby those investors who receive a full allocation are the uninformed investors (Keloharju, 1993; Rock, 1986). Whereas the

information cascade model describes the situation in which investors make decisions sequentially, and those who decide later follow the decisions made by earlier actors (Banerjee, 1992; Bikhchandani et al., 1992). This model builds on the following assumptions: 1) investors make decisions in a sequential order, 2) each investor knows the decisions made by investors ahead of him but not the information that the former decisions are based on, and 3) later investors trust the information of previous investors more than their own. This leads to actors replicating the behavior of other actors on the stock market, and this phenomenon is called herd behavior. Herd behavior in investment decision making, as stated by Bikhchandani and Sharma (2000), describes a type of behavior whereby an investor would have made a certain investment decision if she did not know the decisions of other investors, but she changes her decision when she discovers that others did not make the same decision as she would have on her own. Similarly, she will also make an investment decision when she knows that others have made that same decision. As a result, if the new issues are overpriced, there is a high risk that the first movers in the stock market will not purchase the shares, and such behaviors are amplified by the information cascade, which makes issues unfavorable. Ritter and Welch (2002) found that herd behavior can polarize investors' subscriptions. Similarly, evidence from Amihud et al. (2003) indicates that the new issues are either highly oversubscribed or undersubscribed, with very few cases of moderate subscriptions.

To eliminate both forms of asymmetric information, it is necessary for issuers to determine the issuing price based on the results of book-building, which is part of the

service offered by underwriters. A typical book-building process consists of two steps: 1) some investors will be invited to evaluate the issues, and 2) these investors provide underwriters with the preliminary demand for the shares (Benveniste & Spindt, 1989).

It has been argued that information compensation is one of the theoretical explanations for the underpricing generally observed for new issues (Sherman, 2000; Sherman & Titman, 2002). Based on Sherman and Titman (2002), after the book-building process, the sellers (both issuers and underwriters) tend to compensate these investors with underpriced new issues for offering them evaluating information, as it can be more costly when sellers acquire market information from other channels. Due to the complex book-building process, the more accurate investors reveal their information, the more likely their own interests will be harmed, the mechanism of which will be explained in Chapter 4. Therefore, the more accurate sellers wish the price information to be, the more they need to pay to acquire it, the more money they need to leave on the table for investors, and thus the greater the underpricing will be.

Based on the above analysis, in my opinion, due to imperfections in the stock market, such as asymmetric information, information cascade, etc., two conclusions can be drawn: 1) underpricing might be unavoidable for new issues, and 2) to minimize the cost of such imperfections, it is necessary for issuers to hire underwriters during the initial public offering process.

As stated above, there might be no way to completely eliminate underpricing. In addition to the unavoidable underpricing due to market imperfections, proper underpricing can occasionally be important for the issuers from other perspectives; for

instance, issuers' aim in going public is not only a matter of raising the largest amount of money but also includes achieving other goals, such as having an IPO with a high opening price helps to create a steady and reliable image for the company, shareholders who benefit from the proper amount of underpricing will be pleased with the company and tend to invest more in the future, and so forth (F. Allen & Faulhaber, 1989).

In my opinion, a certain degree of underpricing will decrease the risks of unfavorable subscription and distinguish high-quality companies from ordinary ones, and thus this type of underpricing should be termed *unavoidable underpricing* or *necessary underpricing*. Such underpricing is, to some extent, beneficial for the issuers; however, it is difficult to define the threshold and amount involved. Fortunately, the scope of such underpricing can be clearly defined because it is primarily generated between investors and issuers, and its main function is to compensate for the imperfections in the stock market. In contrast to unavoidable underpricing, *intentional underpricing* or *unnecessary underpricing* arises between issuers and underwriters in the presence of asymmetric information; for instance, underwriters might intentionally underprice the initial shares to benefit their clients, i.e., institutional investors (Figure 5). Intentional underpricing will be further explained in Chapter 3 and Chapter 4.

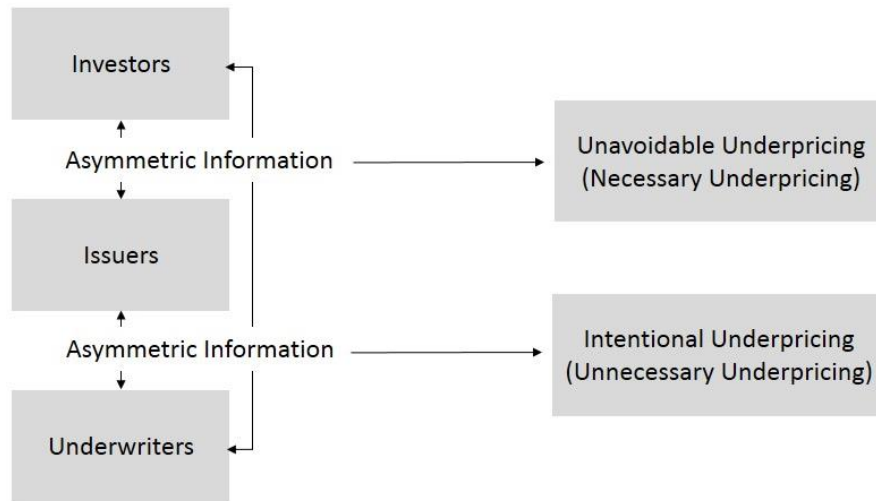


Figure 5 *Asymmetric information among the three parties and the types of underpricing generated thereby.*

To conclude, this chapter explained the interplay among the three parties and their possible conflicts of interest, especially their different preferences regarding two short-term IPO phenomena: underpricing and flipping activities. The terms unavoidable underpricing (necessary underpricing) and intentional underpricing (unnecessary underpricing) were created based on their essential characteristics and the approach by which they are generated. In the following chapters, IPOs and IPO phenomena will be further discussed from the perspectives of issuers, underwriters and investors.

Chapter 3 Issuers in IPOs

In most of the IPO literature, issuers are considered at the firm level, where the entire company is considered a complete and inseparable entity (Beatty & Welch, 1996; Edelen & Kadlec, 2005; X. Li & Masulis, 2003). This is in accordance with the one primary perspective on firm behavior, where a corporation is perceived as a flow of information or decisions (Mintzberg, Raisinghani, & Theoret, 1976), a black box seeking to achieve certain operating goals, regardless of the individuals involved (Jensen & Meckling, 1979).

The other primary perspective is, on the contrary, that the dominant group within the firm is decisive with respect to 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 focus of the latter perspective is the individuals who play significant roles within the firms. These individuals can be either chief executive officers (CEOs) or founders of the issuing firms, both of whom are likely to have strong impacts on IPOs. Specifically, the status whether a CEO is also the founder of the firm is called *CEO founder status*, which has significant influence on IPO and firm performance. For instance, empirical studies have reported that more than half of CEOs at the time of an IPO were founder CEOs, and CEOs with career backgrounds in product research and development fields were more likely to retain their positions during an IPO than CEOs with other types of career backgrounds (Jain & Tabak, 2008). Newly issued companies with founder CEOs were more likely to have greater underpricing than those led by non-founders (Certo, Covin, Daily, & Dalton, 2001). Studies

conducted by Jensen and Meckling (1979) demonstrated that when firms were classified with respect to their socioeconomic backgrounds into categories such as *entrepreneur-run*, *family-run*, and *professionally managed*, firms' levels of diversity and acquisitions were different. Specifically, entrepreneurial firms were most likely to engage in aggressive acquisitions, and professionally managed firms were most likely to be involved in international activities.

Besides the CEO founder status, empirical studies also report prominent differences in corporate performance when CEOs exhibit various characteristics. For instance, regarding age, firms with younger CEOs were found to be more likely to conduct acquisitions, the likelihood of which decreases by 30 percent with a 20-year increase in CEO age (Yim, 2013); firms led by younger managers were likely to have greater sales and earnings volatility than those directed by older managers (Child, 1974); and younger CEOs' compensation was found to be more related to sales growth than that of older CEOs, which might have effects on firm performance (Coughlan & Schmidt, 1985). From the educational perspective, it has been found that administrators with higher education were more receptive to innovation (Kimberly & Evanisko, 1981).

This chapter will discuss two central IPO phenomena, underpricing and underperformance, from the perspectives of CEO founder status and CEO characteristics. Among the various characteristics that CEOs might have an impact, overconfidence will be the representative characteristic in the discussion, not only because it is one of the most frequently studied CEO characteristics in the literature, but also because its direct influence on the two IPO phenomena have yet to be discussed

(Goel & Thakor, 2008; J. M. Lee, Hwang, & Chen, 2015). Hence, CEO founder status, CEO overconfidence and their influence on underpricing and underperformance will be discussed in the following two subchapters.

1. CEO Founder Status

CEOs can be classified into two types based on founder status: 1) founder CEOs, who are the creators of the companies and have led them since their founding, and 2) non-founder CEOs, who become CEOs either through internal promotions or external recruiting (Adams, Almeida, & Ferreira, 2009; Jain & Tabak, 2008).

It is important to discuss the role of founders, as not only is every firm established by one or a group of founders, but this role might also have a lifetime influence on the firm (Nelson, 2003), such as Bill Gates at Microsoft, Steve Jobs at Apple, Gabrielle Bonheur Chanel at Chanel, etc. Founders or founding teams are generally considered to be those who shape firms' behaviors (Beckman, 2006), represent an important source of human capital for firms' long-term development (Colombo & Grilli, 2005), and create the organizational culture (Bass & Avolio, 1993). As a result, it is necessary to distinguish between founder CEOs and non-founder CEOs before proceeding to further analysis.

Founder and non-founder CEOs typically differ in several aspects: 1) the amount of shares controlled, also mentioned as the wealth effect in some studies (Harford & Li, 2007; Jensen & Murphy, 1990), as founder CEOs generally hold a larger stake of company shares than non-founders and thus control more wealth; 2) the length of time

in the CEO's position, which is usually longer for founder CEOs, as founders begin to invest their time and effort on the day when their companies are founded (Allgood & Farrell, 2000); 3) the personal characteristics of these two types of CEOs, which are usually considered as different: for instance, risk-taking has been cited as one of the entrepreneurial characteristics that differentiates founders from non-founders (Begley, 1995); 4) the psychological commitment to their companies, which is often stronger for founder CEOs than for non-founders because founder CEOs are more clear about the company's long-term horizon and are thus more internalized in and identified with their companies (O'Reilly & Chatman, 1986); 5) other differences, such as that founder CEOs are typically younger, with less working experience and receive lower compensation than non-founder or professional CEOs (Wasserman, 2003).

The literature has also shown that founder CEOs and non-founder CEOs behave differently in various aspects of management (Jain & Tabak, 2008). With respect to decision making, founder CEOs have greater influencing power in cooperation management (Adams, Almeida, & Ferreira, 2005). With respect to investment, firms with founder CEOs generally make larger investments in research and design (R&D), spend more on capital expenditures, and launch more focused mergers and acquisitions than firms with non-founder CEOs, as founders are more innovative and prefer to adopt more aggressive strategies than non-founder CEOs (Fahlenbrach, 2009). With respect to motivation, founder CEOs are more psychologically attached to their firms and thus more intrinsically motivated than non-founders (Wasserman, 2006). Interestingly, regarding influencing power, founder CEOs exhibit a significantly lower turnover rate

when accounting irregularities occur than non-founder CEOs because in such situations, CFOs are willing to exit and take the blame for founder CEOs, which leads to a high turnover rate in CFOs when firms with founder CEOs are sanctioned for accounting irregularities (Leone & Liu, 2010).

In the following two subchapters, differences in the IPO phenomena (underpricing and underperformance) of founder CEOs and non-founder CEOs will be discussed. In the last subchapter, the psychological explanation for effects of founder status will be analyzed to explain why founder and non-founder CEOs perform differently.

1.1 CEO founder status and IPO underpricing

Empirical studies have found that among firms undergoing an IPO, those with founder CEOs can be distinguished from those with non-founder CEOs with respect to ownership structures of IPO shares (Nelson, 2003). For instance, in an IPO company, the higher the percentage of equity held by the CEO, the more likely it is that the CEO is a founder; during the initial public offering stage, founder CEOs are less likely to sell a large percentage of shares to public investors than are non-founder CEOs, i.e., founder CEOs are less likely to conduct flipping activities. In my opinion, these two outcomes result from the fact that founder CEOs have greater psychological attachment to their firms, and thus they have greater motivation to retain a controlling stake, especially after the firms go public. Theoretically, psychological attachment and willingness to control should mean that founder CEOs are less likely to encourage underpricing than are non-founder CEOs.

However, an empirical study showed the opposite results where issuing firms with founder CEOs were more likely to exhibit underpricing. Study by Certo et al. (2001) revealed that founder CEOs are less likely to negotiate over an IPO's first day offering price than non-founder CEOs. They contend that this phenomenon is caused by founder CEOs' lack of experience in issuing new shares, which results in managerial uncertainty when bargaining with underwriters. As noted in Chapter 2, underwriters generally tend to underprice new shares to pursue their own interests or due to their relationships with other clients (e.g., institutional investors). Thus, underwriters might exploit founders' lack of experience and weak bargaining position and leave more money on the table than necessary, meaning that IPOs involving founder CEOs would tend to have more significant underpricing than IPOs involving non-founder CEOs. Consequently, from the perspective of underpricing, founder CEOs might be detrimental to owners' interests by underestimating the value of their firm. However, this also entails a larger price leap in the new shares. As previously stated, one of the main differences between founder CEOs and non-founder CEOs is that the former tend to hold a relatively large number of shares (Harford & Li, 2007; Jensen & Murphy, 1990). Thus, such a price leap would also generate a substantial increase in a founder CEOs' personal wealth. According to prospect theory, as stated in Chapter 2, the pleasure from experiencing a rapid increase in personal wealth will be stronger than the pain brought by the dilution of control, and it is possible that founder CEOs who hold the major proportion of shares will ultimately be pleased by underpricing (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992). In other words, a substantial increase in the share price would please

shareholders, who will overlook the fact that their companies should have been valued more highly and the IPO should have raised more capital; alternatively, holding the amount of capital raised constant, fewer shares should have been sold and firm control should have been less diluted.

1.2 CEO founder status and IPO underperformance

Because underperformance is a long-term IPO phenomenon, in my opinion, CEO founder status and its impact can be observed along two dimensions. One dimension is the longitudinal dimension, where CEO founder status in the sample firms changes over time and firm performance is compared ex ante and ex post. The other dimension is the cross-sectional dimension, where firms' performance across different CEO founder statuses is compared at a specific point in time.

1.2.1 CEO founder status and IPO underperformance on the longitudinal dimension

Numerous studies have focused on the likelihood that founder CEOs will retain their CEO titles after achieving unusual success during their employment (Elsaid & Ursel, 2012; Jain & Tabak, 2008; Parrino, 1997; Wasserman, 2003). For instance, an empirical study found that founders were highly likely to leave their positions after they reach certain milestones in developing their companies (Wasserman, 2003). Specifically, these milestones refer to “the completion of product development” and “the raising of each round of financing from outside investors” (Wasserman, 2003, p.

149). Going public, obviously, belongs to the latter category.

Despite the influence of individual characteristics (such as working experience and length of tenure), the primary reason that founder CEOs are replaced is that founders' skills and abilities are no longer sufficient to complete the new tasks that emerge after the milestones are reached (Wasserman, 2003). For instance, when companies have successfully developed new products, skills such as organizing, marketing and selling skills become more important than innovating, designing and developing. Founder CEOs who do not acquire such abilities are likely to leave their positions. In the case of successful financing, founders are more likely to be asked to leave office by investors who doubt the founders' ability to effectively maintain the firm's long-term performance or simply the skills to manage the company (Wasserman, 2003). The greater the funding that the company requires from investors, the more likely it is that the crucial decisions regarding a change in CEO will be influenced by investors. In such a scenario, it can be assumed that a change in CEO founder status might prevent IPO companies from experiencing future underperformance. In other words, it can be assumed that in the secondary market, founder CEOs are more likely to lead to underperformance than are non-founder CEOs, especially when investors have asked the founders to leave office.

In contrast to being fired or forced to leave, founder CEOs also might leave their company voluntarily after an IPO. Here the term *leave voluntarily* is defined in Parrino (1997) as follows: "the incumbent takes a comparable position elsewhere or departs from previously undisclosed personal or business reasons that are unrelated to the

firm's activities" (p. 172). Begley (1995), by examining the relationship between founder status and firm age, showed that founder CEOs in young firms have a stronger intention to pass on their firms or their shares as personal property to their heirs. Especially in the event that a substantial success, such as reaching the milestone of issuing a successful IPO, is achieved, founder CEOs are more likely to leave office voluntarily because this situation means that they are in a better bargaining position to convince the board and thus are more likely to pass on the CEO position to their heirs, for instance, their children. In the context of founders voluntarily leaving and passing on the firm to their heirs, long-term performance will be discussed in detail in Subchapter 1.3.1 of this chapter.

1.2.2 CEO founder status and IPO underperformance on the cross-sectional dimension

Studies also found significant correlations between CEO founder status and their IPOs' long-term performance from the cross-sectional dimension. For instance, Nelson (2003) found that, after an IPO, the stock market reaction was generally stronger for firms led by founder CEOs than those led by non-founders. This can be possibly explained by the fact that investors value firms led by founders higher than firms led by non-founder CEOs. In other words, IPO firms with founder CEOs are less likely to exhibit underperformance than those with non-founder CEOs, from the cross-sectional perspective.

Regarding post-IPOs' financial performance and the surviving time, firms with

founder CEOs are more likely to have better financial performance and are more likely to survive for longer compared to those with non-founder CEOs. This result is particularly pronounced when the founder is both the CEO and the chairman of the board (He, 2008). One of the reasons for a better financial performance and a longer surviving time is the founder CEOs require less compensation compared to non-founder CEOs. Based on He (2008), the reduced demand for compensation is primarily due to founders' intrinsic motivation. The corporate governance structure, especially regarding whether ownership and control are separated, moderates the relationship between founder CEO status and company performance. When ownership and control are combined, namely when the founder CEO is also the owner of the company, CEOs tend to exhibit pro-organizational and collectivistic behavior (Corbetta & Salvato, 2004; Y. Ling, Zhao, & Baron, 2007). Thus, the previously mentioned finding that investors are more likely to ask founders to leave office during an IPO could be a costly and ineffective strategy. When founder CEOs lead their companies to improved financial performance for less compensation and due to their greater intrinsic motivation, it is only reasonable to ask them to leave when the cost of their lack of skills exceeds the additional compensation required to hire a new CEO, who is hopefully capable of delivering the same level of financial performance, which can be challenging to measure in practice. As a result, in my opinion, the decision to fire founders should be made with great caution and rigid measurements.

As stated above, going public is an important milestone during corporate development, which is, both theoretically and practically, prone to cause founder CEOs

to leave their position. By performing a more detailed analysis of the factors that might influence the likelihood of founders remaining as CEOs during the initial public offering phase, Jain and Tabak (2008) determined that elements such as the support of insiders and the founding team, the outsider control, and personal characteristics of the CEO (e.g., age, background) are all correlated with the likelihood of founder CEOs remaining in office. Specifically, the factors influencing the likelihood of founder CEOs remaining in office can be summarized as follows.

First, the size of the founding team and the proportion of insiders on the board are positively related to the likelihood that founder CEOs will remain in their positions during an IPO. These two factors can provide founders with greater bargaining power to retain the CEO position. Jain and Tabak (2008) also noted that Wasserman (2003) supported their hypothesis, who reported that founders remain CEO for relatively longer periods when their co-founders remain with the firm.

Second, the proportion of outside block holders, the influence of venture capital, and the top management team (TMT) independence are negatively related to the likelihood of founder CEOs remaining in office during an IPO. Both outside block holders and venture capitals are likely to have a negative influence on the independence of TMT. The less independent the top management team is, the more likely it is that the decisions made by the board will favor outsiders' interests; for instance, outsiders might replace the founder CEO when they believe that he or she is no longer suitable as the chief executive. One notorious example is that Steve Jobs was voted out of the CEO's position by the board of directors in the spring of 1985, four years after Apple's IPO

and nine years after he founded the company.

Third, founder CEOs who have a background in departments concerned with output functions, such as product research and development (product R&D), marketing, and sales, tend to be more likely to remain in office during an IPO than CEOs whose background is in throughput functions departments, such as financing, accounting, production and process engineering. The concepts of output function and throughput function were developed by Hambrick and Mason (1984). They found that CEOs with output functional backgrounds concentrate more on the company's innovation and growth, while CEOs with throughput functional backgrounds focus more on the company's internal and external stability.

Fourth, CEO age is negatively related to the likelihood of founder CEOs remaining in office during an IPO. Numerous recent studies have demonstrated that CEO age is important with respect to risk-taking (Elsaid & Ursel, 2012), acquisition activities (Yim, 2013), learning abilities (Henderson, Miller, & Hambrick, 2006), and even financial reporting qualities (Huang, Rose-Green, & Lee, 2012). Older CEOs tend to be more risk averse, be less involved in acquisition activities, and have relatively worse performance in dynamic industries that require fast learning and adaptation but provide better quality financial reports. These findings emphasize that CEO age plays an important role in corporate governance, and CEOs in distinct phases of their tenures have different focuses. In my opinion, the characteristics of younger CEOs are more appropriate for the IPO stage, which requires the founders to be more innovative, more dynamic, more risk-taking and to have stronger ability of adapting.

1.3 Psychological explanations for the effects of CEO founder status

There are several ways to disentangle the reasons that CEO founder status influences firm performance in general. As previously stated, the main differences between founder and non-founder CEOs are: 1) the number of shares controlled, 2) tenure in the CEO position, 3) personal characteristics, and 4) psychological commitment. Thus the first part of this subchapter attempts to disentangle the various effects of founder status by comparing family companies, heir-controlled companies and founder CEO companies, which differ mainly in the latter two respects. The second part will explore the basic personal characteristics of founder and non-founder CEOs with respect to risk preference, locus of control and Type A behavior. The third part will introduce the psychological commitment of founder and non-founder CEOs.

1.3.1 Comparisons among family companies, heir-controlled companies and founder CEO companies

In my opinion, it is necessary to compare family firms, heir-controlled firms and the founder CEO firms in the following discussion because they share similar characteristics with respect to the wealth effect and tenure, but differ in the dimension of executives' personal characteristics and psychological commitment. As a result, by comparing the performance of companies with founder CEOs, family firms and heir-controlled companies, it is possible to distinguish the effects of personal characteristics and psychosocial commitment from those of other factors.

There are numerous studies on the relationship between CEO status and company performance in general. Here CEO status specifically refers to whether the CEO is the founder or a family member of the founder (Anderson & Reeb, 2003; D. Miller & Breton - Miller, 2006; Sciascia, Mazzola, Astrachan, & Pieper, 2012). A wide range of company performance indicators is considered, including market value, stock prices, operating performance and accounting performance. In essence, these studies examine two questions: 1) what are the effects of a company being operated by the person who creates it, and 2) what are the effects of a company being operated by a family member or an heir of the founder. The results indicated that in the former situation, founder CEOs typically have a positive influence on performance, while in the latter situation, company performance can be either better or worse relative to non-family or non-heir-controlled firms (Adams et al., 2009).

In the literature comparing family firm performance with non-family firm performance, some studies demonstrated that firms controlled by family members outperformed those with non-family managers, and this finding was primarily explained through stewardship theory and because they entail lower agency costs than non-family managers (Anderson & Reeb, 2003; D. Miller & Breton - Miller, 2006). Stewardship theory describes situations in which managers are motivated by goals that are aligned with those of their principals, namely pro-organizational and collective behaviors, instead of individualistic goals such as wealth and reputation (Davis, Schoorman, & Donaldson, 1997).

Furthermore, when family firms are divided into two groups whereby one group

of firms has founder CEOs and the other group includes firms with non-founder but still family CEOs, the former generally exhibit better performance. For instance, one empirical study found that family succession predicted a 4 percent decline in operating profitability and such underperformance is particularly significant in rapidly developing industries, industries that require skills, and large companies (Bennedsen, Nielsen, Pérez-González, & Wolfenzon, 2007). One possible explanation of this phenomenon is offered by Brandstätter (1997), namely, that in terms of personality characteristics, founders are typically more emotionally stable and independent than owners who inherit control of the company from parents, relatives, or spouses. Additionally, the founders were found to be more willingly to expand their firms, more likely to attribute successful outcomes to their own effort, and more satisfied with their roles as CEOs (Malmendier & Tate, 2005a; Resick, Whitman, Weingarden, & Hiller, 2009). As a result, certain types of personality characteristics such as self-attribution, independence and emotional stability are innate in founder CEOs, instead of gained over time (Brandstätter, 1997).

Interestingly, when comparing the performance of family, heir-controlled companies with that of CEOs who are not related to the founders in every way, it seems after these firms going public, the investors find the former firms less convincing than the latter. For instance, an empirical study reported the result that CEOs who obtained their positions by being related to the founder through blood or marriage underperformed relative to unrelated CEOs with respect to financial profitability and book-to-market ratio (Pérez-González, 2006). As stated in Chapter 1, the book-to-

market ratio is widely employed in finance to measure investor confidence in a firm. Thus, the above finding indicates that investors do not have strong confidence in these firms, and thus these firms attract relatively limited interest from investors. Results from Pérez-González (2006) also indicated dramatic underperformance by family CEOs who did not attend a selective college was found. This result suggested that the reason for the underperformance associated with inherited control was the limited set of candidates from which to choose a successor CEO.

However, there has been a dispute regarding whether family firms in general outperform non-family firms. Recent studies have attempted to resolve this argument by differentiating firms with respect to parameters such as firm size and ownership concentration. For instance, D. Miller, Minichilli, and Corbetta (2013) argued that family firms will outperform when these firms have both a small scale and a compact ownership concentration and underperform when they have both a large scale and dispersed ownership concentration. Under a moderate degree of family control, no direct impact on company performance can be found. From the perspective of the number of international companies and the level of family ownership, the amount of international entrepreneurship peaks when family ownership is moderate, and declines when the family ownership is either high or low. This result was presented in an empirical study of 1,035 American family firms conducted by Sciascia et al. (2012). The number of international firms represents a proxy for firm performance and the quality of cooperate governance.

In my opinion, another possible reason that it is difficult to generalize family firms'

performance is that the founder's status is unclear. Studies on the relationship between firm performance and founder status, as the only independent variable, should be performed. In such a study, three groups of firms should be analyzed: 1) firms with a founder CEO, 2) firms with a non-founder but family CEO, and 3) firms with non-family CEOs. Other factors which might have an influence on firms' performance should be used as controlled variables, such as firm size, the concentration of CEO control, CEO age, CEO educational background, CEO previous experience, etc. It has been found by previous studies that these factors affect firms' performance with different outcomes and to different extent. For instance, the reason why firm size should be considered is that there are certain sized firms which are within the founder's capacity to control. Besides these factors, I think in the next part, it is necessary to examine psychological differences between founder CEOs and non-founder CEOs, which might have substantial potential to explain why founder CEOs have better performance in certain cases.

1.3.2 Personal characteristics and founder CEOs

Psychologically, there are several characteristics that can distinguish founders from non-founders. One of the studies which made a good summary is from Begley (1995), who stated that founders establishing a new firm are more likely to exhibit risk-taking, external locus of control, and Type A behavior.

Risk taking propensity. The relationship between risk taking propensity and entrepreneurship has been quite controversial. For instance, Brockhaus (1980) found

that risk-taking propensity is not a distinguishing character of entrepreneurs; however, a significant risk-taking propensity was observed among entrepreneurs in a study using a sample of 71 entrepreneurs and 62 non-entrepreneurs (Ahmed, 1985). In my opinion, one of the essential reasons for these divergent conclusions is that scholars employ different definitions of an *entrepreneur*. Returning to Brockhaus (1980) as an example, there, an entrepreneur was defined as “a major owner and manager of a business venture who is not employed elsewhere” (p. 510). Thus, this definition combines both entrepreneurs who founded a company and those who take over an existing company. However, according to Ahmed (1985), “entrepreneurship is defined for the purpose of this study as a person who starts a business of his own” (p. 781), meaning that in Ahmed’s sample, entrepreneurs include only founders. Thus, obviously, the various definitions of entrepreneurship explain differences in these studies’ results.

There are some scholars who regard entrepreneur and founder as different concepts. For instance, Nelson (2003) specifically noted that “an entrepreneur is not necessarily a founder” (p. 708), which makes it important to distinguish between founders and non-founders when considering risk-taking attitudes. There are also studies that regard entrepreneurs as founders, while others employ the contrasting concept of the entrepreneur as a manager, analogous to studies that regard non-founders as entrepreneurs. For instance, one study reported that risk taking was significantly correlated with entrepreneurial traits but not with managerial traits (Pines, Dvir, & Sadeh, 2012). Entrepreneurial traits in this context refer to a “love of challenge, initiative, optimism, creativity, rebelliousness, energy, commitment, being a dreamer,

confidence and independence” (p. 106), and managerial traits include “love to manage, need control, persistence, involvement and realism” (p. 106). The distinctive traits of entrepreneurs and managers, in my opinion, are aligned with the representative characteristics of founder CEOs, who obtain entrepreneurial traits, and non-founder CEOs (or professional CEOs), who exhibit managerial traits. Thus, risk-taking can be regarded as a distinguishing characteristic between founder CEOs and non-founder CEOs.

Locus of control. An internal locus of control, in contrast to an external locus of control, is defined by Rotter (1966) as “if the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics” (p. 1). Thus, individuals possessing an internal locus of control believe in themselves more than those with an external locus, who believe that the success of an event depends on external factors such as luck, fate, unpredictable events, etc. Studies performed by Bonnett and Furnham (1991) among teenagers aged between 16 to 19 revealed that teenagers who were interested in becoming an entrepreneur believed in hard work and had an internal locus of control. This result indicates that an internal locus of control existed long before an individual becomes an entrepreneur. Thus it is a cause of being an entrepreneur, rather than a result.

Type A behavior. Type A behavior, also known as Framingham Type A behavior (Haynes, Levine, Scotch, Feinleib, & Kannel, 1978), was observed by Friedman and Rosenman (1974) when observing their cardiac patients. Though the original terms used to describe Type A behaviors were not clearly defined, the literature in clinical

psychology has reported several characters that are significantly related to Type A behavior, such as self-confidence, change, autonomy, tension, anger symptoms, etc. (Chesney, Black, Chadwick, & Rosenman, 1981; Haynes et al., 1978). This is interesting because the disadvantages of Type A behavior symptoms accord with the results from Kets de Vries (1985); in interviewing and surveying 38 entrepreneurs, they generally observed that these entrepreneurs behave akin to psychologically defensive persons: for instance, they have a “strong distrust for the world around them”, and “they live in fear of being victimized” (Kets de Vries, 1985, p. 160).

1.3.3 Psychological commitment and founder CEOs

As previously stated, another noteworthy finding concerning founder CEOs in young firms is that these CEOs are more likely to expect their children to become their successors in the business (Begley, 1995). In my opinion, this can be explained by the founders’ strong psychological commitment to the firm, meaning that they wish to pass it on as their own property to individuals who they trust. This can also be an explanation for the high founder CEO turnover rate after a successful IPO, as this provides founders with greater leverage to convince and influence the board to pass the firm on to their heirs.

The fact that founder CEOs exhibit stronger psychosocial commitment to their companies can be supported from another perspective. Studies have reported that in IPO companies, founder CEOs required less of both incentive-based and total compensation relative to non-founder CEOs (He, 2008). In my opinion, this

phenomenon compatible with the observation that founder CEOs have stronger intrinsic motivation, meaning that they require fewer extrinsic incentives to reach a given effort level than non-founder CEOs. This strong intrinsic motivation is likely caused by the strong psychological commitment to their firms and the abovementioned stewardship effect.

2. CEO Overconfidence

Overconfidence is defined as individuals having excessive confidence in their personal judgment and decisions (Gervais & Odean, 2001). Svenson (1981) demonstrated that over 70 percent of drivers believe that they are better than average; Weinstein (1980), in a study of 1,258 college students, demonstrated that participants rated the possibilities of experiencing positive events above the average and that of the negative events below the average.

There are several possible explanations for overconfidence. Attribution theory suggests that humans tend to attribute good results to their own ability and bad results to unfortunate external circumstances (L. Ross, 1977); asymmetric information theory illustrates that individuals are better informed of their own abilities in certain tasks than others, and thus their expectations of others' performance are less extreme than those of their own (Moore & Cain, 2007); egocentrism theory suggests that individuals tend to focus on their own performance but overlook that of others (Kruger, 1999).

In reality, in certain circumstances individuals believe that they will accomplish certain tasks, but there are also situations in which they doubt their performance and

exhibit underconfidence. Does overconfidence only occur among certain types of persons under certain circumstances? If so, which types of persons and circumstances are involved? Klayman, Soll, González-Vallejo, and Barlas (1999) found that under- and overconfidence varied systematically with the domain of questions asked, how the questions were presented, and the confidence level of the subjects. Specifically, the findings indicated that 1) the level of overconfidence was significantly correlated with the domain to which the task belongs (West & Stanovich, 1997); 2) the overconfidence was more modest when the question was presented as a two-choice question than as a confidence range (Tversky & Koehler, 1994); and 3) individuals who were generally confident tended to easily become overconfident (Soll, 1996).

Of the studies cited above, which primarily concern how individuals perceive their abilities, some of them are not specified for capturing real-world decision making, especially when personal interests are affected. In other words, will individuals continue to conform to their self-perceptions when making choices or decisions? What if the choices are relate to monetary issues, such as the amount of a salary or bonus? An experiment conducted by Hoelzl and Rustichini (2005) demonstrated that individual choice behaviors exhibited overconfidence when the tasks were easy and familiar, and exhibited underconfidence when the tasks were unfamiliar. These effects are more significant when monetary incentives were involved than when they were not.

When there are many overconfident individuals, questions arise concerning whether they are more successful or whether it is beneficial to be overconfident. On the one hand, models were presented indicating that overconfident managers were more

likely to be promoted to CEO by the boards of value-maximizing companies than less confident managers, even if the former occasionally might have made value-destroying investments (Goel & Thakor, 2008); on the other hand, studies indicated that overconfidence was one of the primary reasons for the failure of new companies (Camerer & Lovo, 1999). Thus, to determine the role that overconfidence plays in CEOs' decisions concerning initial public offerings, the discussion should begin with overconfidence and CEOs in general.

The stereotypical image that is brought to mind by the term CEO is someone who is ambitious, goal-oriented, energetic, inspiring, and above all, confident (Guthey & Jackson, 2005). An empirical study by Klaczynski and Fauth (1996) suggested that regarding career events, individuals who were more intelligent were often more overconfident. Thus, intuitively, a more intelligent manager is usually more competent and thus more likely to be promoted. This also accords with the abovementioned model of Goel and Thakor (2008), suggesting that it was highly likely for an overconfident manager to become a CEO. One potential implication of the model is that CEOs in general are overconfident.

Several motivations for the argument that managers are generally more overconfident than others were provided by Gervais, Heaton, and Odean (2003), which can also be applied to the case of CEOs. First, the complexity of CEOs' work makes CEOs highly prone to overconfidence because individuals become more overconfident when their tasks are more difficult. Second, CEOs' working tasks are unlikely to benefit from the accumulation of experience over time, since the environment based on which

CEOs make their decisions is highly uncertain, thus the preconditions for learning from experience are absent. Those conditions include the frequent occurrence of similar problems, rapid outcomes of decisions and clear feedback (Kahneman & Lovallo, 1993). However, the typically working tasks of CEOs are replete with change, long-term based, and lack clear feedback. Third, in most cases, CEOs obtain their positions through a series of promotions, and managers with successful performance are those who are promoted. Based on attribution theory (L. Ross, 1977), CEOs have likely accumulated many more false attributions than other managers who have not been promoted to CEO, as the former believe that they are the reasons for their success. Gervais and Odean (2001) demonstrated that this sort of attribution error was one of the factors leading to overconfidence. Fourth, selection bias could also play a role in CEOs' overconfidence: on the one hand, managers who are overconfident and optimistic about their future might be more likely to apply for the CEO position than those who are not; on the other hand, board tends to select managers with a confident and optimistic appearance, as not only is this regarded as a sign of greater ability, but also managers who are moderately overconfident require less compensation to be motivated and thus are less expensive for the board (Gervais, Heaton, & Odean, 2011).

From the perspective of conducting mergers and acquisitions, by analyzing data from the period 1980 to 2002, Billett and Qian (2008) found that positive previous merger and acquisition experience led to a high likelihood of subsequent acquisitions, and future deals that tend to be driven by overconfidence generally created negative wealth effects. These results on the one hand support attribution theory (L. Ross, 1977),

and on the other hand demonstrate that CEOs are not only promoted because of their overconfidence but also become increasingly overconfident as their successful experience accumulates, even though which might lead to unpleasant result. For instance, according to the model developed by Goel and Thakor (2008), once CEOs' overconfidence became excessive, they tended to be dismissed by the board.

In my opinion, it appears that careers of CEOs exhibit various levels of overconfidence: being promoted due to moderate overconfidence, becoming increasingly overconfident over time, and being fired once they become excessively overconfident. If this is the case, CEOs of IPO companies can be considered to be at their optimal level of overconfidence: it drives them not to act too abruptly while remaining sufficiently ambitious. Unfortunately, the current literature rarely focuses on the relationship between CEO overconfidence and IPOs and instead on that between acquisitions and general performance, which makes it potentially promising for future research. Thus, the following sections will begin with these two factors and then attempt to shed light on CEO overconfidence and IPOs.

2.1 CEO overconfidence and IPO underpricing

Beyond studies focusing directly on CEO overconfidence and IPO underpricing, there are numerous other studies on CEO overconfidence and acquisitions. These studies, in my opinion, can be used as reference for two primary reasons. First, as mentioned in Chapter 1, one of the reasons that a company chooses to go public is to become a *shell company*, that is, a target company that other firms can use to go public

by simply acquiring it instead of going through the routine IPO process (Aydogdu et al., 2007). Therefore, acquisitions can be regarded as one channel for going public, which can be considered parallel to the most common issuing process. Second, despite the differences between acquisition and IPO, both activities send a similar signal to shareholders that the company is experiencing rapid development. According to the agency relationship, such favorable news might trigger similar psychological mechanisms in CEOs who engage in acquisitions and those who launch IPOs, which could be caused by compensation incentives, the tournament effect with other agents, or other factors that will benefit the CEO due to his well-regarded performance (Certo, Daily, Cannella, & Dalton, 2003; Grinstein & Hribar, 2004). As a result, existing work on CEOs' overconfidence and their acquisition behavior can be used as a reference when researching the correlations between CEO overconfidence and IPO underpricing.

Based on the extant literature, one hypothetical outcome of CEOs' overconfidence is that it increases the likelihood of pursuing an IPO. This can be supported by the observation that CEOs exhibiting overconfidence tend to behave in a risk-loving way, especially when they are motivated by compensation or options they will receive after successfully conducting mergers and acquisitions (Malmendier & Tate, 2005b).

Besides the increased likelihood of conducting an IPO, several publications showed that overconfidence during acquisition could be value-destroying because overconfident CEOs were more likely to overpay for the target company (R. Brown & Sarma, 2007; Malmendier & Tate, 2005b, 2008). Hence, one might assume that overconfident CEOs could be more likely to underprice their IPO shares due to the

abovementioned similarities between acquisitions and IPOs. R. Brown and Sarma (2007) suggested that both CEO overconfidence and CEO dominance were key factors which influence a company's acquiring decisions, and CEO dominance was no less important than overconfidence in making acquisition decisions. Hence, it was further suggested that a higher proportion of independent directors should be present on the board to constrain CEO dominance and CEO overconfidence in decisions to undertake acquisitions (R. Brown & Sarma, 2007). If CEOs' rash decisions regarding acquisitions were the shareholders' primary concern in their agency relationship, having an autonomous board of directors should be a feasible solution. Similarly, it can be assumed that it is necessary to control overconfident CEOs' IPO related decisions, in other words, to restrict CEOs' dominant power in decisions such as setting the initial prices, before it harms shareholders' interests.

However, if considered from another perspective, CEO overconfidence might have the opposite influence on underpricing. Based on proposition in the literature that the *better-than-average* effect of overconfident CEOs makes them believe that their companies can generate higher profits and are better than their peer companies (Malmendier & Tate, 2005b), hence, CEOs' overconfidence might influence the price setting of the initial shares, which to some extent mitigates the underpricing phenomenon.

Consequently, for future studies, there are three main issues regarding the relationship between IPOs and CEOs' overconfidence that remain unclear: 1) whether CEOs' overconfidence affects the likelihood of pursuing an IPO, 2) what are the

outcomes of such influences on underpricing, whether they increase or decrease the amount of underpricing, and 3) if increase, how to keep them from harming the shareholders' interests.

2.2 CEO overconfidence and IPO underperformance

In general, how does overconfidence affect a CEO's performance and further on affect the firm performance, which can be used for studying the underperformance of IPO in future research? A review of this subject will help to provide a macroscopic perspective on how psychological mechanisms interact with CEO performance and will hopefully offer additional insights into the relationship between CEO overconfidence, IPO decision making and IPO long-term performance.

Just as every coin has two sides, there have been in essence two opposing arguments regarding how overconfident CEOs influence firm performance: on the one hand, some results showed that CEO overconfidence could lead to unfavorable consequences, such as negative wealth effects on shareholders (Billett & Qian, 2008); on the other hand, a study found that overconfident CEOs could have positive influence on firm performance, such as prompting innovation in firms (Hirshleifer et al., 2012). As there are increasing numbers of (over)confident managers being promoted to CEO, it appears that the latter argument is more consistent with the reality: having overconfident CEOs must provide the shareholders or the board with more particular advantages than those CEOs who are not overconfidence. An interesting finding in this regard was that executives who were born in earlier years appear to be, on average,

more conservative than younger managers; additionally, managers with an MBA background were more likely to undertake relatively aggressive and bold strategies. For instance, with a sample from 1969 to 1999, every ten-year decrease in age was found to result in an average 1.7-percentage-point decline in capital expenditures, and older CEOs tend to accept lower managerial risks and engage in less diversification (Bertrand & Schoar, 2003). If combined with the results from several studies (see Aktas, De Bodt, & Roll, 2005; Billett & Qian, 2008), which have reported that CEOs tended to gain experience and became overconfident over time, these studies suggest that young CEOs and managers from a more recent generation were generally more aggressive and confident than young CEOs and managers from the previous generation. This phenomenon, if considered from an evolutionary perspective, indicates that the corporate governance environment in the 1990s required more aggressive and confident CEOs and managers than the 1960s environment. Hence, if less confident CEOs were gradually eliminated through board decisions or competition among peers at the managerial level, this could be compatible with the assumption that overconfident CEOs provide more advantages than disadvantages. The advantages of overconfident CEOs, as stated previously, primarily including producing additional innovation in firms, requiring less compensation, devoting more effort to work, reducing the cost of agent conflicts, and reducing the financial risks, provide further evidence of this (Gervais et al., 2011; Hirshleifer et al., 2012). However, overconfident CEOs are also more likely to engage in acquisition activities, which might lead to long-term underperformance (Malmendier & Tate, 2008). Thus in the following subchapters,

explanations will be provided from these perspectives.

2.2.1 CEO overconfidence and innovation

Using options exercise behavior and press coverage to measure CEOs' level of overconfidence and the number of patents and total citation count by other new patents as measures of innovative output, Hirshleifer et al. (2012) studied CEOs and cooperate innovations from 1993 to 2003 and found that overconfident CEOs were better innovators than less confident CEOs. Overconfident CEOs were more likely to invest in risky projects, and they generated more innovations measured by patents and total patent citations. On the one hand, investing in risky projects results in higher volatility in stock returns, but on the other hand, Hirshleifer et al. (2012) also found that overconfident CEOs were better at seizing external growth opportunities and translating them into firm value, especially in industries in which innovation is important.

The going public phase is usually in which a company develops at its greatest rate, with numerous outside opportunities and innovative ideas. As a result, hiring a CEO who can exploit external opportunities and is sufficiently bold to invest in innovative projects might be important for companies who are planning to go public. As there is no empirical literature on the relationship between overconfident CEOs and the value of IPO companies, it can be only assumed that IPO companies with overconfident CEOs have higher firm values than IPO companies with CEOs who are less confident, for the reason that former tend to be more innovative than the latter. Additionally, several studies have found that innovative firms tended to control larger market shares

and have higher competence (Blundell, Griffith, & Van Reenen, 1999; Danneels, 2002). As a result, it is reasonable to propose a hypothesis that firms with overconfident CEOs have greater value than do those with less confident CEOs. Specifically, the level of CEO overconfidence can be measured by two parameters, as in Malmendier and Tate (2008), using portrayals of CEOs in the press to measure outsiders' perceptions of CEO overconfidence and using CEOs' personal investment in their companies to measure their own level of confidence in the company; the value of the firm can be measured by both the initial price and the price of the shares after the initial date.

Consequently, from the perspective of innovation, overconfident CEOs tend to be involved with more innovative firms, which might increase firm value and, theoretically, decrease the likelihood of long-term underperformance.

2.2.2 CEO overconfidence, compensation and effort

In addition to CEO overconfidence and its possible effect of increasing firm value, studies have found that overconfidence might also help to reduce the cost of the firm, from the perspective of CEO compensation. The argument that overconfident CEOs require less compensation than less confident CEOs might appear to be paradoxical because, intuitively, overconfident CEOs should believe that they are better than average and thus will demand more compensation than less confident CEOs. However, a model presented by Gervais et al. (2011) did not support this intuition. In a basic principal-agent model, the principal is usually assumed to be risk neutral and an agent to be risk averse, as the principal can create a portfolio that allows him or her to balance

individual risks while agent's payoff is closely linked to a single project for which he must bear the individual risk (Milgrom & Roberts, 1992). Such risk aversion decreases the utility of the agent's well-being, consequently, the more risk averse an agent is, the higher compensation he or she requires to compensate for the disutility caused by the risk premium. As mentioned above, overconfident CEOs are usually more aggressive in making decisions, and they are also less risk averse than less confident CEOs (Ben-David, Graham, & Harvey, 2007). Therefore, overconfident CEOs have lower risk premiums and require less compensation for a given level of motivation than less confident CEOs. In the extreme case, when CEOs are particularly overconfident, it is possible that the principal will exploit the agent's bias and offer a highly convex contract. In such a contract, agents can only obtain higher compensation by working extremely hard. When agents are particularly overconfident, they believe that they will always be compensated to a greater extent than they can actually achieve, and thus they are always willing to accept highly convex contracts. In this situation, principals will obtain future benefits because such behavior represents a form of arbitrage regarding the CEO's excessively optimistic belief in the outcomes of his decision (Gervais et al., 2011; Goel & Thakor, 2008).

From another perspective, the model developed by Gervais et al. (2011) demonstrated that overconfident CEOs exerted more effort than less confident CEOs for a given level of compensation. This is likely one of the most prominent reasons that overconfident agents are promoted to CEO.

Compensating overconfident CEOs as if they were less confident entails two

primary disadvantages: 1) the shareholders' payoff is decreased because they are overpaying their CEOs, and 2) overconfident CEOs are more sensitive to compensation than less confident CEOs, and thus excessive payment is more likely to encourage overconfident CEOs to make risky decisions which might turn out to harm the shareholders' best interests (Gervais et al., 2003). Due to the findings that overconfident CEOs are generally more likely to make risky decisions than less confident CEOs, when compared to overconfident CEOs, less confident CEOs need to be provided with stronger incentives, namely increased compensation. Similarly, when overconfident CEOs receive the same level of compensation as less confident CEOs, they are more likely to engage in risky behavior that might harm the principals' interests. As a result, in practice, it is important to identify the extent of CEOs' confidence and compensate them accordingly.

Consequently, from the perspective of compensation and effort, overconfident CEOs tend to require less compensation and devote more efforts, both of which decreases the cost of firms and theoretically decrease the likelihood of long-term underperformance.

2.2.3 CEO overconfidence and agent conflict

A CEO with a moderate level of overconfidence was found to cause less agent conflict than a less confident CEO, and interestingly, this moderate level of overconfidence was found to encourage the CEO to make decisions that would be aligned with shareholders' interests (Gervais et al., 2003). In their model, Gervais et al.

(2003) argued that, when making decisions, less confident CEOs tended to postpone decisions longer than necessary due to their high level of risk aversion. Such postponement behavior was found to be, in most scenarios, contrary the best interests of shareholders. For CEOs with a moderate level of overconfidence, as they perceived the risk of the potential project to be lower than it actually would be, they tended to make the decision faster than rational CEOs, which would be aligned with the best interests of shareholders.

In my opinion, the impact of overconfidence can also be interpreted from another perspective: overconfidence helps to reduce conflict between principals and agents and makes a principal-agent contract more effective. As the aim of introducing compensation or performance pay in a principal-agent contract is to decrease principal-agent conflict and align the two parties' interests (Eisenhardt, 1989), when overconfidence serves a similar function to compensation, theoretically it should be true that less compensation is necessary in a contract involving overconfident agents than in a contract involving less confident agents.

Consequently, from the perspective of agent conflict, overconfident CEOs tend to decrease agency cost, and hence decrease the likelihood of long-term underperformance.

2.2.4 CEO overconfidence and companies' financial risks

Apple Computers has had a reputation for operating without debt for nearly 20 years, until 29 April 2013 when it began to sell its first bond offer (Cornell & Shapiro, 1987). It appears that the company's financial policy has changed since the exit of its

former CEO, Steve Jobs, in October 2011. Steve Jobs was well known not only for his achievements with Apple Computers but also for his self-confident character. There is an interesting description from his autobiography by Isaacson (2011) concerning how he became employed at Atari, “I (Alcorn, the boss of Atari) was told, ‘We’ve got a hippie kid in the lobby. He says he’s not going to leave until we hire him. Should we call the cops or let him in?’” (p. 43). This shows that he was not only persistent but also overconfident enough to wear sandals in the lobby of a company where he wished to work. Jobs also ranked as one of the greatest innovators in the last 75 years by Business Week in 2004. This combination of overconfidence, zero-debt financial policy, and innovative behavior, as explained in section 2.4.1, might be no coincidence, which was supported by the results from Malmendier and Tate (2005a). With the panel data from Forbes 500 CEOs, their results showed that overconfident CEOs tended to regard external funds as an unduly cost and these CEOs are more interested in accumulating cash flows. As a result, companies with overconfident CEOs are more apt to retain a large cash pool and low external debt.

According to Kraus and Litzenberger (1973), financial leverage, which is calculated as debt divided by equity, is a proper measure of a company’s financial risk. The greater the leverage is, the greater the likelihood that the company will be vulnerable to financial risk or bankruptcy. A large cash pool can prevent the company from closing down if the cash flow ceases. As a result, overconfident CEOs can, to some extent, reduce financial risks, from the perspectives of lower financial leverage and operating with sufficient cash flows, which decreases the likelihood of long-term

underperformance.

2.2.5 CEO overconfidence and companies' financial risks

Overconfident CEOs are more apt to undertake acquisitions. By analyzing CEOs' personal investment in their companies and outsiders' perceptions of their degree of overconfidence, Malmendier and Tate (2008) found that CEOs who were considered overconfident were 65 percent more likely to launch an acquisition. In their study, they used portrayals of CEOs in the press to measure outsiders' perceptions of CEO overconfidence, and used CEOs' personal investment portfolios to reveal CEOs' beliefs concerning their firms' prosperity. The press portrayal data in their sample were collected from articles mentioning CEOs in the following leading business publications: The New York Times, BusinessWeek, Financial Times, Economist, and Wall Street Journal. The number of articles containing words such as *confident* or *confidence* and *optimistic* or *optimism* was used as the CEO overconfidence variable, and the number of articles containing the words *reliable*, *cautious*, *conservative*, *practical*, *frugal*, or *steady* was used as the variable representing rational CEOs.

On the one hand, as there are few studies on the direct relationship between overconfidence and IPOs, in my opinion, these two proxy methods for measuring overconfidence, portrayals of CEOs, and their personal investment can both be used to examine the relationship between CEO overconfidence and the likelihood of conducting IPO. On the other hand, as stated in Chapter 1, acquisitions could lead to IPO long-term underperformance (Brau et al., 2012). Consequently, from the

perspective of acquisition, overconfident CEOs might increase the likelihood of long-term underperformance.

2.3 Psychological explanations for CEO overconfidence

Evidence of CEO overconfidence can be traced back to 1988, when Cooper et al. (1988) conducted a study using a sample of 2,994 entrepreneurs. They found that 81 percent of the entrepreneurs regarded the *odds of your business succeeding* as 7 out of 10 or even more and 33 percent perceived the success of their business as 10 out of 10. Interestingly, when the participants were asked about the *odds of any business like you succeeding*, 39 percent of entrepreneurs perceived the odds as 7 out of 10 or better and 11 percent perceived the odds as 10 out of 10. The responses to these two questions are overly optimistic given the success rate of new entrepreneurs. In my opinion, the gaps between these two proportions are impressive (48 percent and 22 percent, respectively), which can be interpreted as indicating that 48 percent and 22 percent of these entrepreneurs believed that their firms would be successful simply because they were the leaders. Additionally, the perceived odds also appear to be overly optimistic compared to the average survival rate of new entrepreneurs after 6 years during the period from 1986 to 1988, which was 39.8 percent (Phillips & Kirchhoff, 1989).

As stated above, there are two possible reasons that CEOs are overconfident: first, CEOs could be “born” that way, meaning that they already possessed this characteristic before becoming CEOs, or in other words, overconfidence is one of the reasons that a person becomes a CEO; second, CEOs could become overconfident over time, meaning

that they “gain” this characteristic through the process of operating their firms, or in other words, overconfidence is a result of being a CEO (Billett & Qian, 2008).

2.3.1 Overconfidence as the reason for becoming a CEO

It is, again, therefore necessary to analyze this question by dividing CEOs into founder CEOs and non-founder CEOs. In this subchapter, the term *professional CEO* will be used to replace the term *non-founder CEO*, as there are few extant studies of overconfidence among inherited CEOs who obtain their positions through blood or marriage. As a result, this subchapter will primarily discuss whether founders and professionals were already overconfident before becoming CEOs.

One paradoxical result that might support the assumption that founder CEOs were born to be overconfident is the high failure rate of new startup firms. Hayward, Shepherd, and Griffin (2006) presented their model and demonstrated that the more overconfident CEOs are, the more likely they were to deprive their startups of resources, and thus the more likely their startups were to fail. In their study, depriving a firm of resources referred to situations such as overconfident founders being more willing to start their firms with smaller endowments or being more likely to reduce the liquidity of their firms. In these two cases, firm resources were either insufficient from the beginning of the startup or made insufficient during the managerial process. In my opinion, that result shows that overconfident people tend to start their own firms and become CEOs, regardless of the success rate. In other words, overconfidence is the reason for becoming a CEO.

In contrast to founder CEOs, professional CEOs appear to exhibit less overconfidence. An empirical study by Busenitz and Barney (1997) showed that, when comparing the founders of start-up companies with an average time of 1.7 years since the founding day and managers from middle- to upper-managerial levels in large organizations, the former group was significantly more overconfident than the latter, operationalized by respondents overestimating the likelihood of being correct.

Furthermore, if founders' overconfidence can lead to a startup's complete failure, and the overconfident founder CEOs can be found only in the firms which are relatively young? Are all of the overconfident CEOs eliminated and only those with a moderate level of confidence remain? An up-to-date empirical study of CEOs from large S&P 1,500 companies indicated that, among firms considered large and successful, founder CEOs exhibited more overconfidence than professional CEOs. Additionally, founders were found to have more optimistic forecasts regarding their firms and were more likely to regard their firms as undervalued (J. M. Lee et al., 2015).

In my opinion, based on previous studies, the following conclusions can be drawn: founder CEOs are born to be overconfident; they can either lead their firms into dangerous situations, in many cases even failure, or they can lead the firms to survive and thrive, during which time their overconfident characteristic remains, or might even increase (this will be discussed in the following subchapter). Regarding professional CEOs, there is no general conclusion, and it is quite likely that they are not excessively overconfident before they become CEOs, and they are not as overconfident as the founder CEOs. It can be the case especially in the case of middle- to upper-level

managers in large firms, and they remain less overconfident once they become CEOs compared to the founders.

2.3.2 Overconfidence as the result of being a CEO

From an evolutionary perspective, if overconfidence is considered as sort of irrationality, it should have been eliminated through the long progress of human evolution. However, if overconfidence is a bias that generally exists, especially among CEOs, overconfident individuals should be beneficial to their companies if they are to “survive” during their careers as managers.

From a purely economic perspective, overconfident entrepreneurs are argued to have the tendency to make decisions based on their own information instead of following herd behavior, which causes valuable information that is privately owned by less confident entrepreneurs to spread throughout the group. As a result, overconfident CEOs tend to lead their firms in a more rational way than less confident CEOs and avoid having their decisions influenced by herd behavior (Bernardo & Welch, 2001).

From the behavioral perspective, it has been observed that entrepreneurs (both founder CEOs and professional CEOs) become more overconfident when the environment becomes more complex (Forbes, 2005). Thus, it can be assumed that the larger a firm becomes, the more overconfident the CEO is likely to be. Comparable results have been reported in the case of bank CEOs: the longer they served in their positions, the more hubris they exhibited and the more likely they were to attribute good news to themselves and bad news to the external environment (N. M. Brennan &

Conroy, 2013).

Regarding the rate at which overconfidence increases during CEOs' tenure, founder CEOs appear to gain overconfidence more rapidly than professional CEOs. This can be supported by empirical evidence indicating that the difference in overconfidence between senior founders and professional CEOs is larger than that between junior founders who just graduated from university and professional CEOs (J. M. Lee et al., 2015).

Based on the above mentioned literature, founder CEOs exhibit a greater level of overconfidence than professional CEOs, both before they became CEOs and while they served as CEOs. For founders, overconfidence can be interpreted as one of the reasons that they became CEOs and as a consequence of working as CEOs. Professional CEOs are more likely to be "humble" before they become CEOs, and their overconfidence also increases during their time in office, but to a relatively lesser extent when compared to founder CEOs.

This chapter reviewed IPOs from the CEO's perspective and with respect to CEO founder status and CEO overconfidence. In addition to these topics, it explained IPO two main phenomena: underpricing and underperformance (Figure 6). Based on the extant literature, some aspects of the relationship between CEO and IPOs remain unexplained, such as CEO overconfidence and IPO underpricing, which offers a potential focus for future research.

The next chapter will review IPOs from the perspective of underwriters. Specifically, IPO phenomena, underpricing and underperformance, will be discussed

on the basis of both economic and psychological studies.

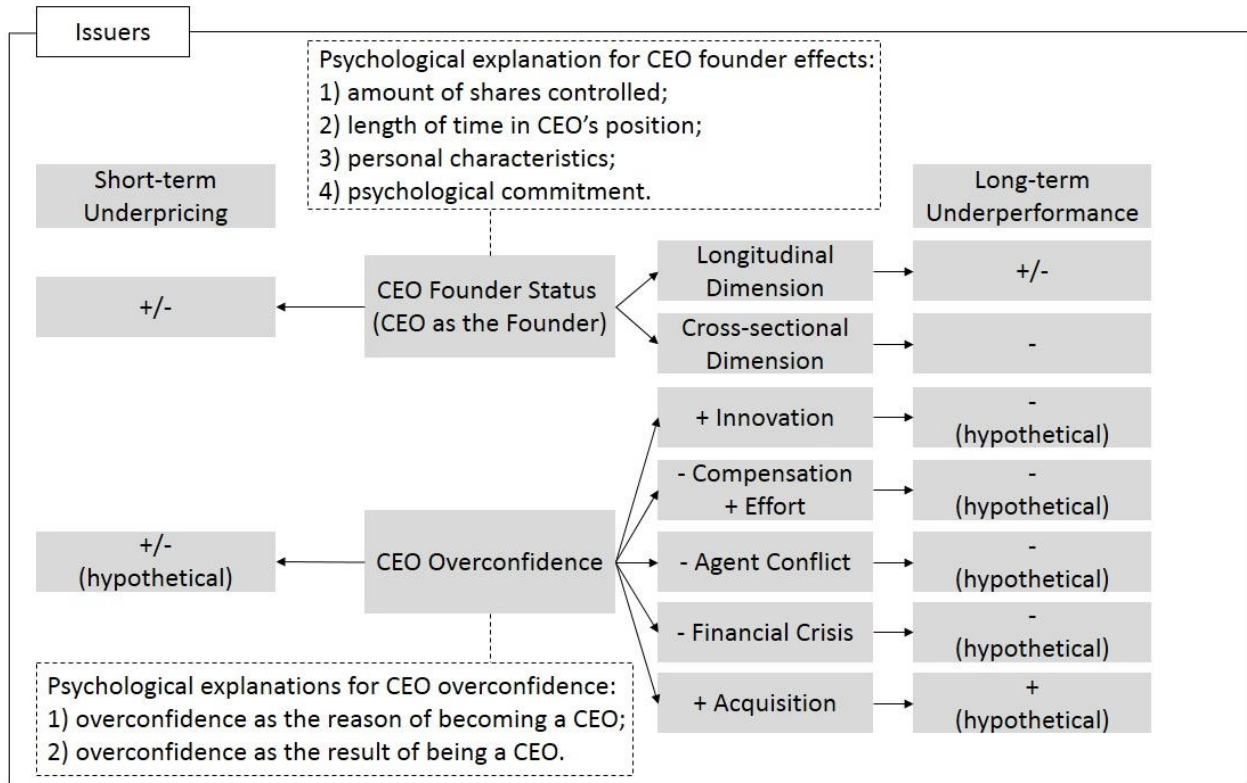


Figure 6 The influence of CEO founder status and CEO overconfidence on short-term IPO underpricing and long-term IPO underperformance. The pluses and minuses reflect how two factors are correlated. For instance, CEO overconfidence increases the likelihood of company innovation, and hence a plus sign is placed in front of “innovation”. “Hypothetical” means that there are no direct empirical studies on these aspects, and hence the positive or negative correlations can be only assumed based on extant studies.

Chapter 4 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 2014, 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, 2015c).

As stated in the previous chapters, 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. When the opportunity cost is considered, i.e., the gains issuers would have made from devoting their time and energy to operating the business instead of conducting an IPO on their own, hiring underwriters can represent a savings for issuers (Kanas & Qi, 1998; Posnett & Jan, 1996). Additionally, anecdotal statistics reveal that, in the 1970s, over 90 percent of IPO companies went public with the participation of underwriters (Smith Jr, 1977). Furthermore, of the 32 companies that issued initial public offerings from November

2014 to December 2014, all hired underwriters (Renaissance Capital, 2015b). Statistics also 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 2014 (Ritter, 2014a). Thus, underwriters have consistently played a significant role in the IPO process in recent decades, which makes it crucial to discuss the tasks that underwriters perform in an IPO.

For years, more than one underwriter has consistently been involved in a given IPO (Ritter, 2014a). Theoretically, a single underwriter is also capable of executing an IPO. For instance, Rajan and Servaes (1997) included IPOs with one underwriter in their sample covering the period from 1985 to 1987. However, in practice, the complete underwriting service is conducted by a group of underwriters, which is referred to as an *underwriter syndicate* in most circumstances (Oesch, Schuette, & Walter, 2015; Pollock, Porac, & Wade, 2004).

Empirical studies have found several advantages of forming an underwriter syndicate, such as risk sharing, fair information practices, and increased monitoring of issuing companies (Corwin & Schultz, 2005; R. S. Hansen & Torregrosa, 1992; 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 that the likelihood of revising initial-price-related information was positively correlated with 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 it enhances the intrinsic value of the issuing company, i.e., 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 last two 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 reasons make issuers willing to hire an underwriter syndicate instead of a single underwriter.

An important consideration in most collective relationships, including syndicates, is the homogeneity within the syndicate, where homophily principle can be applied. "Similarity breeds connection" (McPherson, Smith-Lovin, & Cook, 2001, p. 415), and homophily principle states that once categorizes one's personal environment with respect to similarity in features such as race, ethical behaviors, age, and religion. One

example demonstrating that the homophily principle can be applied at an interorganizational level was provided by Shi and Tang (in press). Their empirical study showed that, in the U.S., numerous joint venture activities were significantly associated with both religious and ethnic similarity, which supports the hypothesis that firms with similar cultures tend to establish strategic alliances (Cartwright & Cooper, 1993). Brass, Galaskiewicz, Greve, and Tsai (2004) also conducted a study at the interorganizational level. They categorized the extant literature based on the features of firms that had been studied, such as homogenous motives, trust, learning, and equity. The similarity of such features was found to foster the creation of strong ties among firms.

However, no extant study (either empirical or theoretical) has focused directly on the possible similarities among members of underwriter syndicates, which, in my opinion, might have profound implications for the study of underpricing. Using the abovementioned studies as a reference, it can be assumed that members of an underwriter syndicate that share more similarities tend to have closer ties with one another. Furthermore, closer ties might lead to less diversified opinions regarding the initial price, which increases the likelihood of underpricing (Corwin & Schultz, 2005). Hence, I propose a hypothesis for future study: the greater the similarities that are shared among the members of an underwriter syndicate, the more likely it is that IPO shares will be underpriced. Note that there are several factors that might influence the likelihood of forming a syndicate in addition to homogeneity. For instance, the popularity of the issuing firm's industry, the issuing firm's home region, the maturity of the issuing firm, the group size of the underwriter syndicate, and the syndicate's

density, i.e., the extant relationship ties among the potential syndicate members. These factors are derived from an empirical study of U.S. venture capital syndicates from 1985 to 2007, which showed that even with distant geographical and industrial ties, certain features increased the likelihood that venture capitalists would form a syndicate. These features include: 1) the current investment popularity of the target company's industry, 2) target company's home region, 3) how mature the target company is, 4) the size of the syndicate and 5) the density of the relationships among members (Sorenson & Stuart, 2008).

In addition to homogeneity within an underwriter syndicate, heterogeneity is also required because different members are supposed to perform different functions during an IPO process. An underwriter syndicate can be divided into three groups with respect to function: the management group, the underwriting group, and the selling group (Torstila, 2001). Note that categorization of these groups is not only based on the various functions of each group but also according to the sequence of when each group is active during the IPO process. However, the classification is not based on the role of a single underwriter. In other words, possible overlaps exist across these three groups, and one syndicate member can serve in more than one of the three groups. Various factors, such as the number of new issues, the scale of the issuing companies, and the relationship between underwriter and issuer, might cause such overlap (Corwin & Schultz, 2005; Pichler & Wilhelm, 2001).

This chapter will describe each group in sequential order according to their tasks during the IPO process. The functions of each group and their influence on IPO

underpricing and underperformance will be the main focus.

1. The Management Group

According to Torstila (2001), the management group includes one lead underwriter and several co-managers. The obligation of the management group is to structure the syndicate and to invite audit companies, legal firms, and investment banks to join the other two groups. In other words, the function of the management group, specifically the lead underwriter, is to serve as the recruiter and organizer of the members of the syndicate (Torstila, 2001).

1.1 Lead underwriter

A lead underwriter, as the name implies, is the leader of the underwriter syndicate and the head of the management group. It functions as a combination of the three groups: in addition to recruiting, it administrates the road show, as the underwriting group does (Krigman et al., 2001); it helps to distribute IPO shares, as the selling group does, for instance, for IPOs on the NASDAQ Stock Exchange between 1997 to 2002, the clients of lead underwriters purchased 8.79 percent of the total issue amount (Griffin, Harris, & Topaloglu, 2007). Note that the recruiting and organizing function, which selects the underwriters that will be invited to participate in the syndicate, is an unique function that the members of other groups are unable to exercise (Cheolwoo Lee, Jeon, & Kim, 2011). To my understanding, this is also the reason that the lead underwriter is placed in the management group.

Theoretically, lead underwriters are important because they determine the members of the syndicate; empirically, lead underwriters influence issuers in various ways. For instance, results indicate that more prestigious lead underwriters were involved in IPOs with lower returns because such underwriters tend to choose issuers with lower issuing risk (Carter & Manaster, 1990); another study showed that the activities of lead underwriters before IPO issuance were closely related to the rate of return on the initial day, and the activities of lead underwriters after IPO issuance can have a long-term effect on issuers' underperformance (Logue, Rogalski, Seward, & Foster-Johnson, 2002). Furthermore, by focusing on the influence of Lehman Brothers' bankruptcy after the financial crisis in 2008, Fernando, May, and Megginson (2012) found that among all Lehman's clients that received underwriting, advisory, analyst, and market-making services, only the underwriting clients suffered a substantial, on average 5 percent within 7 days, the aggregate risk-adjusted amount of which is \$23 billion.

Hence, the selection of lead underwriters is of significant importance. There are two 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).

In addition to the mutual selection model, most studies have focused on the unidirectional selection model. This model emphasizes factors influencing issuers' choice of lead underwriters, where issuers select underwriters to cooperate with and underwriters' opinions are not considered. For instance, IPOs supported by venture capitalists were found to be more likely to hire underwriters with all-star analysts (X. Liu & Ritter, 2011). Empirical study from Japan showed that issuers were more likely to choose underwriters where their board members had previously worked (Takahashi, 2014).

In practice, for instance in the U.S., issuers are the final decision makers concerning whether they will collaborate with lead underwriters. Such decisions are usually made through a *bake-off* stage, which is also referred to as a *beauty contest* or *beauty pageant* (Fernando et al., 2005; Jenkinson & Jones, 2009a; Lowry & Schwert, 2004). The bake-off is usually held a minimum of six months before the IPO. In the bake-off, investment banks compete via written proposals and oral presentations (Jenkinson & Jones, 2009a). This may be the main reason that most studies focus on the unidirectional selection model, i.e., only consider the issuers' perspective. In

addition to the capabilities and services underwriters offer (Fernando et al., 2005), two other factors were found to influence issuers' choice of lead underwriters.

The first is the previous lending relationship. By analyzing 16,625 US debt and equity offerings (including IPOs), the main factor influencing lead underwriter choice was found to be the previous lending and underwriting relationships with banks (Ljungqvist, Marston, & Wilhelm, 2006). For IPOs, the dominant factor is the lending relationship because there cannot be any previous underwriting relationship. In other words, issuers prefer to choose their previous lenders as their lead underwriters. Similar results can be found in empirical studies by Bharath, Dahiya, Saunders, and Srinivasan (2007) and Drucker and Puri (2005).

The second factor is the underwriter's reputation. 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). The argument that the underwriters with better reputation are usually correlated with better after-market performance by issuing firms was also supported by evidence from other countries, such as Chinese non-state-owned IPO firms that collaborated with more prestigious underwriters exhibited significantly better performance (C. Chen, Shi, & Xu, 2013).

However, the correlations between underwriters' reputation and the amount of underpricing vary across samples from different countries. For instance, an empirical study from Australia showed that issuers that cooperated with more prestigious

underwriters tended to exhibit greater underpricing (Dimovski, Philavanh, & Brooks, 2011), analysis from China showed that there was no significant relationship between underwriters' reputation and underpricing (Su & Bangassa, 2011), and results from the U.S showed that more prestigious underwriters were correlated with lower returns, i.e., lower underpricing (Carter & Manaster, 1990).

There are several potential explanations for such results: different stock market regulations, different demands for IPO shares, and the different periods considered by the studies. An empirical study from Japan showed that levels of underpricing depended on the demand for the issues. For hot IPOs, the level of underpricing was positively related to underwriters' reputation; for cold IPOs, the level of underpricing was negatively related to underwriters' reputation (Kirkulak & Davis, 2005). The period of the study is also important because the focus of IPOs has changed over time. Loughran and Ritter (2004) divided the years between 1980 and 2003 into four periods: 1980s, 1990-1998, 1999-2000, and 2001-2003, when the average first-day return on IPOs was 7, 15, 65 and 12 percent, respectively. They argued that in the last period, namely after the internet bubble (1999 to 2000), the focus of IPOs shifted from maximizing issuers' proceeds to increasing individual wealth. In other words, before the internet bubble period (1999 to 2000), issuers sought underwriters that minimized underpricing such that new issues can be sold at the highest price; after the bubble period, issuers began to cooperate with underwriters, which created greater underpricing, and hence pre-IPO shareholders could increase their personal wealth. Specifically, X. Liu and Ritter (2010) found that for hot IPOs, executives of issuing firms who had personal accounts with

stock brokers intentionally sought underwriters with a reputation for severe underpricing instead of avoiding them. One approach whereby lead underwriters can engender substantial underpricing is to have high *analyst coverage*, in other words, having a large number of affiliated analysts (Cliff & Denis, 2004).

Because this is the first appearance of the term analyst coverage in this dissertation, several concepts related to analyst coverage need to be clarified, which is also an interesting phenomenon I observed when reviewing the available literature. There is no universal definition of the term analyst coverage, but there are four common meanings of the term. First, it is used to describe the number of analysts or the size of the analyst group tracking and observing a specific stock or firm (see Bhushan, 1989; Cliff & Denis, 2004). Second, it refers to all of the individual analysts in an analyst group or to an analyst group as an entity. Such studies are typically related to *all-star analysts* who are prestigious and are able to cause strong market reaction (Clarke, Khorana, Patel, & Rau, 2007). Third, it represents analyst recommendations, such as in the research of James and Karceski (2006), where “favorable” (p. 1) was used to describe the coverage, and “strength of coverage” (p. 2) was used to describe analyst recommendation, such as strong buy, buy, etc., similar to the usage in Bradley, Jordan, and Ritter (2008). Fourth, it is used to refer analyst forecasts (H. C. Chen & Ritter, 2000). An analyst forecast represents the analyst’s prediction of a certain firm’s future earnings (as in analyst earnings forecast) or a firm’s future development (as in analyst growth forecast). Differences between these two types of forecasts can be found in Lin and McNichols (1998).

Thus in this dissertation, to avoid confusion, I will only use the term *analyst coverage* as in the first sense, which is to describe the number of analysts. In the other three cases, I will explicitly use the terms *individual analyst* or *analyst*, *analyst recommendation*, and *analyst forecast*, respectively. In the last case, *analyst earnings forecast* and *analyst growth forecast* will be specifically noted when necessary.

To conclude, on the one hand, issuers need to be particularly cautious when choosing lead underwriters because issuers might be strongly influenced by negative news related to their lead underwriter; on the other hand, issuers tend to primarily consider the following three factors during their decision-making process: 1) the capabilities and services of underwriters, 2) previous lending relationship, and 3) underwriter reputation. However, whereas there is no universal consensus concerning whether issuers pursue prestigious underwriters, the two other factors are positively correlated with the likelihood that an issuer will cooperate with an underwriter.

1.2 Co-manager

The other role in the management group is the co-manager. Currently, there is typically more than one co-manager in an underwriting syndicate, all of which are chosen by issuers during the bake-off stage in a similar process to that used to select the lead underwriter (H. C. Chen & Ritter, 2000; Ellis et al., 2000). Before the 1980s, a single lead underwriter was the only participant and performed the roles of all three groups in a single IPO underwriting deal (H. C. Chen & Ritter, 2000). In other words, 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 5.4 in 2014 (Ritter, 2014a).

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 are eager 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 identical². 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 issuing activities, namely SEOs (Corwin & Schultz, 2005; Krigman et al., 2001). Krigman et al. (2001) showed that in a sample of

² The examples from H. C. Chen and Ritter (2000) only include the case in which there is one co-manager. In the case of multiple co-managers, the approach to splitting commissions will be different.

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 also two main reasons for hiring co-managers. First, the fees issuers pay for the entire underwriting syndicate are fixed in most cases³, 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). An analysis of a sample of 3,032 IPO firms showed that adding an extra co-manager could increase the number of analysts who follow the stock by between 0.36 and 0.55 (H. C. Chen & Ritter, 2000). Additionally, the larger the size of the issuing firm and the amount of the IPO issuance are, the more analysts the issuer would require (Barth, Kasznik, & McNichols, 2001). As a result, for issuers with large firm size and IPO issuance, it is necessary to hire more co-managers who will thus bring more analysts.

³ Here, "most cases" means that there 77 percent of the sample of 1,101 IPOs from 1995 to 1998 adopted the 7-percent payment method, with the trend increasing over time. The 7-percent payment method is especially popular among IPOs with proceeds from \$20 million to \$79.99 million, reaching 91 percent among the sample from 1995 to 1998.

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.

In my opinion, based on the statistics from Ritter (2014a), 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). Thus 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.

In my opinion, 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. "Investment bankers readily admit that the IPO business is very profitable"(H. C. Chen & Ritter, 2000, p. 1105). When competing to be an issuer's

favorite underwriter, bankers are more likely to be in a weaker position when bargaining with the issuer. Additionally, Corwin and Schultz (2005) found that having more co-managers tended to provide fairer information related to the initial price, and thus less underpricing would be created. Therefore, in my opinion, the function of co-managers can be interpreted as supervisors hired by the issuers rather than as assistants to the lead underwriter. No extant studies have explicitly focused on the role of co-managers from this perspective, and interesting results might be found by studying which party has a stronger influence on how co-managers execute their roles in an IPO process. Furthermore, a hypothesis that issuers with more co-managers might exhibit less underperformance can be proposed for future study, if the results of the study proposed above were to show that co-managers function more as supervisors for the issuers than as the assistants of lead underwriters.

2. The Underwriting Group and the Selling Group

In the previous subchapter, lead underwriters and co-managers were introduced as the management group that administrates the underwriting business and recruits other members of the syndicate. In addition to these two parties, the literature tends to neglect other underwriters in the syndicate because they are the lower-tier underwriters and play insignificant roles (Yasuda, 2005). However, in this dissertation, as the three groups are differentiated according to functions instead of entities, the other two groups that serve underwriting and selling functions are considered equally important. The order in which these functions are performed is in accordance with the practical

sequence of the IPO process, which demonstrates how an underwriter syndicate operates during different phases of underwriting IPO shares. Because the underwriting group and selling group share numerous similarities, the similarities will first be presented in the following paragraphs, and the differences will be presented in Subchapters 2.1 and 2.2.

The underwriting group and selling group can jointly be termed the non-management group, the members of which are selected by lead underwriters and issuers. The non-management group holds less responsibility in an IPO process compared with the management group and receives substantially lower commissions. For instance, the number of new shares that will be allocated to the non-management group for further distribution is decided 48 hours before the initial date, while for the lead underwriter and co-managers, the numbers of shares allocated is decided upfront (Corwin & Schultz, 2005; Narayanan, Rangan, & Rangan, 2004).

There are several parties that might be hired as members of a non-management 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); and 3) parties that have personal ties with important individuals of the lead underwriter or the issuers (Corwin & Schultz, 2005; Takahashi, 2014). 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. Hence, it is highly likely that some members engage in flipping activities when issuers intend to reward them.

Conversely, members that wish to maintain relationship with issuers are less likely to flip to preserve the potential for future cooperation. No extant studies have analyzed flipping activities from this perspective. Thus, future studies could use the type of relationship between issuers and underwriters as an indicator of flipping activities, where the more likely future cooperation is, the less likely underwriters will be to engage in flipping activities.

The underwriting group is responsible for the paperwork that must be submitted to the SEC and the documents to be disclosed to the public. The most important paperwork and documents include 1) Form S-1 required by the SEC as a registration statement, which includes a preliminary prospectus stating the range of the anticipated offer price and the amount of the new issues; 2) various pieces of financial information on the issuers, such as annually audited financial statements, interim unaudited financial statements and other required company financial information; 3) a final prospectus clarifying the final offer price shortly before the IPO; and 4) relevant legal documents (U.S. Securities and Exchange Commission, 2015c).

Among the abovementioned four parts, the final prospectus (the third part) should be considered a common function performed by both the underwriting group and the selling group. On the one hand, the main difference between the preliminary prospectus and the final prospectus is that the latter includes the final offer price, and the former includes only the offer price spread. In other words, the majority of the preliminary prospectus remains unchanged in the final version (Daily et al., 2005; Garfinkel, 1993). On the other hand, functionally, the preliminary prospectus is prepared to obtain the

approval of SEC, whereas the final prospectus is prepared for potential investors. Thus, in my opinion, based on the main contributors to and purposes of these two prospectuses, the final prospectus should be considered a joint task of the underwriting group and selling group.

The selling group is primarily composed of investment banks. Following SEC approval, this group conducts the road show, collects requests from clients, especially institutional investors, and distributes the shares to the primary investors (Torstila, 2001).

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).

2.1 The underwriting group, underpricing and underperformance

As stated above, the main task of the underwriting group is to compile documents that need to be submitted to the SEC and the public. This task can also be disentangled into a three-stage process: information discovery, integration and disclosure.

The three stages take place in a sequential order, which has not been presented or analyzed in the extant literature. Hence, in the following part, factors that might influence the main IPO phenomena (underpricing and underperformance) will be discussed with respect to these three operations, information discovery, information integration, and information disclosure. Note that the information discussed here is more formal and transparent than the information considered in a later stage of an IPO, namely the road show or market making stage, due to SEC regulations (U.S. Securities and Exchange Commission, 2015f). Specifically, the approach by which documents that present such information is strictly regulated and thus can be measured under universal standards. For instance, in the U.S., financial statements are regulated by accounting standards issued by American Accounting Association (American Accounting Association, 1966), and the SEC regulates how the preliminary prospectus must be compiled (U.S. Securities and Exchange Commission, 2015e). In my opinion, such information will directly influence the success of the IPO application, the analyst recommendations and forecasts, issuers' underperformance, and indirectly, the offer price and the popularity of the new issues among investors.

2.1.1 Information discovery

This stage begins when the underwriting group begins to collaborate with the issuers. Underwriters' main objectives during this stage are: 1) to conduct due diligence research and obtain the relevant information through direct communication with issuers, 2) to cooperate on external audits for IPO and legal experts, and 3) to review the issuers'

financial statements (Michaely & Womack, 1999; Sjostrom Jr, 2005). A large body of studies has focused on the asymmetric information between issuers and investors (Cohen & Dean, 2005; Hughes, 1986), and most of these studies focused on the case in which underwriters have superior information relative to issuers (Baron, 1982; Muscarella & Vetsuypens, 1989). However, in my opinion, instances of asymmetric information in which issuers possess more information than underwriters can have a larger impact on underwriters' outcomes, as, at this stage, underwriters are the most important intermediaries from which investors obtain information. Hence, underwriters having inferior information directly leads to asymmetric information between issuers and investors.

In my opinion, there are two potential explanations for the lack of research in this context. First, it is difficult to measure and compare issuers' financial status before and after underwriters' participation because all financial information is privately owned before an IPO. Furthermore, the prospectus compiled by the underwriters contains not only raw information from before underwriters' participation but also information that has been categorized and sorted by the underwriters. Second, in this stage both issuers and underwriters are driven by the same goal: to ensure that the SEC approves the IPO application. Hence both parties might intend to collude. Further details on such possible connivance will be discussed in Subchapter 2.1.2, on the information integration stage. As stated above, information disclosed by the underwriting group is the primary information revealing issuer characteristics to investors, and hence when both parties tend to connive and engage in window-dressing behavior, positive illusions concerning

issuing firms are likely to be created. In the short term, such illusions might temporarily generate high demand from individual investors for IPO shares, which would lead to an instant rise in the stock price in the secondary market and increase the level of underpricing. In the long term, the market bubble created by such an illusion will burst when the temporary demands from individual investors disappear and, in turn, increase the extent of underperformance. Thus, asymmetric information between underwriters and issuers at this stage might lead to issuers' underpricing and underperformance and hence should be studied.

I hereby propose several possible parameters to measure the asymmetric information at this stage. 1) The ambiguity of the prospectus. An ambiguously worded prospectus might suggest that information is not fully disclosed, and thus the hypothesis should be that the extent of the ambiguity in the prospectus is positively correlated with issuers' underperformance. For information on a parameter to measure ambiguity, refer to Arnold, Fishe, and North (2010) and Goetzmann, Ravid, Sverdlove, and Pons-Sanz (2008), where relative word counts between hard information and soft information were used to measure the level of ambiguity. According to Arnold et al. (2010), hard information refers to numerical information, whereas soft information refers textual information. In other words, the proportion of disclosed textual and descriptive information is positively related to the ambiguity of the prospectus. 2) Changes between the preliminary prospectus and final prospectus. Significant changes between these two versions of the prospectus (except for the initial price) made for no clear reason can be interpreted as issuers having not fully disclosed their information. Hence, once could

hypothesize that the amount of changes between two prospectuses is positively correlated with issuers' underperformance. 3) Differences in the opinions issued by the third-party audit and that of the underwriting group. While it is rare for their opinions to conflict, when significant conflict is detected, the possibility of biased judgments must be considered (however, such conflicts can also be results of the audit). Hence, one can hypothesize that the extent to which the opinions of auditors and underwriters conflict is positively correlated with issuers' underperformance. Studies related to auditing firms, underpricing and underperformance have been conducted and found, among other observations, that there is less underpricing for auditing firms with higher reputation (Wang & Wilkins, 2007) and that audit quality is positively correlated with the survival rate of IPO companies (Jain & Martin Jr, 2005). Such studies reveal the importance of auditing firms and demonstrate the importance of noticing differences of opinion between auditors and underwriters and the possible correlation of such differences with issuers' underperformance.

2.1.2 Information integration

During this stage, underwriting group analyzes the information generated and discovered in the previous stage, compiles Form S-1 (one of the required forms in an IPO application) and other related documents (U.S. Securities and Exchange Commission, 2015c). As stated above, because both issuers and underwriters share a common motivation during this stage, they are likely to engage in collusive activities when disclosing the information.

In my opinion, this stage provides limited opportunities for underwriters to collude with issuers, except for the information disclosed in the prospectus, as the remaining information must be presented under universal standards according to SEC regulations. For instance, financial statements requires a format that is beyond the scope of underwriters' influence (American Accounting Association, 1966; U.S. Securities and Exchange Commission, 2015e). It can be assumed that there is greater opportunity for collusion when information is less transparent and relatively informal. This assumption is based on studies about transparency in general, where market transparency was found to reduce collusive price effects (C. Schultz, 2005), transparency was positively correlated with personal accountability (Roberts, 2009), and financial standards are accompanied by information quality and transparency (Lambert, Leuz, & Verrecchia, 2007). Note that the extent of information transparency differs throughout the underwriting process, such as the transparency of information released by sell-side analysts while making recommendations in the road show and information revealed during market making of the selling stage, both of which will be discussed in subsequent subchapters.

In my opinion, a prospectus is the type of document that contains the most ambiguous information of all documents provided by the underwriting group. In a prospectus, 10 sections contain information that might substantially influence investors' decision making (U.S. Securities and Exchange Commission, 2015c). 1) The prospectus summary, which includes a general introduction to issuers, such as their routine business, corporate strategy, general financial condition, and prospective uses

of the raised funds. 2) Risk factors, which could significantly influence business and future performance from the perspective of the issuing company's management. 3) The use of proceeds, which specifies the plans for the money raised from issuing new shares. 4) Dividend policy, which includes the future plans for paying dividends and the historical payments to shareholders. 5) Dilution, which exists in most cases and means that the book value of a stock is different from the average price paid by all existing shareholders. 6) Selected financial data, which include specified financial data from the previous five years (in some cases, two years or even none⁴). 7) Management's discussion and analysis, which discloses issuers' financial conditions from the management's perspective. 8) Business, which describes issuers' business in detail, such as significant suppliers, consumers, competitors, and subsidiaries. Additionally, legal proceedings are conducted at the end of this section, disclosing significant litigation in which the issuers are involved. 9) Management, which reports biographic information on directors and CEOs. 10) Financial statement and notes, which consists of the audited financial statements for the previous three years (in some cases, two years⁵). Additionally, this section begins with an auditor's opinion from the unbiased auditor who has audited the issuer's financial statements (U.S. Securities and Exchange Commission, 2015c).

Of the 10 sections of the prospectus, the 1) prospectus summary, 2) risk factors

⁴ According to the SEC, only two years of selected financial data are required if the company is an "emerging growth company", which has less than \$1 billion in revenue. No selected financial data are required if the company is a "smaller reporting company", meaning that its stock will be valued at less than \$75 million in public transactions after the IPO.

⁵ According to the SEC, only two years of financial statements are required if the company is an "emerging growth company" or a "smaller reporting company".

and 7) management's discussion and analysis contain mostly textual information rather than numerical information. As stated above, textual and descriptive information is considered soft information that is highly ambiguous (Arnold et al., 2010; Petersen, 2004), and thus these sections might convey ambiguous information, and investors and researchers should devote additional attention to them.

There are a few extant studies focusing on IPO prospectuses from different perspectives. For instance, no significant correlation was found between the information offered in the prospectus (such as founder CEO status, board prestige, and firm size) and the initial price (Daily et al., 2005), whereas prospectus information (such as firm size, prior profitability, and spending on research & development (R&D)) was found to be a useful forecast of IPO firms' survival rate. Specifically, firm size and prior profitability are positively correlated with the one-year abnormal return after the IPO; spending on R&D is also related to the one-year abnormal return but only to a limited extent (Bhabra & Pettway, 2003).

In my opinion, most extant studies have focused on the numerical information contained in the prospectus, such as firm size and age instead of textual information. The lack of such studies could be due to the abovementioned reason that the parameters to measure the extent of asymmetry are difficult to obtain. One approach in practice to decrease information ambiguity is that laws and regulations should encourage privately owned companies to reveal their financial information to the public, as is the case in Italy (financial information on privately owned Italian companies can be found at www.cerved.com). As such changes might be difficult to implement in the short run, it

might be more realistic to require companies that plan to issue IPOs to provide financial information two or three years ahead of the issuance, instead of revealing such information after the underwriters' investigation. By implementing such regulation, it would be possible to reduce the likelihood of issuers exploiting their superior information and of collusion between issuers and underwriters.

2.1.3 Information disclosure

During this stage, all relevant documents prepared in the previous stages are disclosed to the public and submitted to the SEC. Such information is available to all public investors through the SEC database (U.S. Securities and Exchange Commission, 2015d). These IPOs are called *filed IPOs*, which are awaiting approval from the SEC (Busaba, Benveniste, & Guo, 2001). After this stage is complete, the tasks of underwriting group are considered complete, and the selling group becomes active.

2.2 The selling group, underpricing and underperformance

The tasks of the selling group include conducting the road show, collecting the demands of investors, and allocating the new issues (Torstila, 2001). In my opinion, the selling group of an underwriter syndicate functions similarly to the sales department in a commodity enterprise, except that the commodity sold by an underwriting syndicate is IPO share. In this subchapter, the functions of the selling group will be introduced based on the sequence of functions in an underwriting process. Additionally, factors influencing IPO phenomena such as underpricing and underperformance will be

discussed, and possible avenues for future research based on the extant literature will be proposed.

2.2.1 Release of analyst recommendations and forecasts

Analyst recommendations, earnings forecasts and growth forecasts are typically released by an analyst employed by the lead underwriter (Bradley, Jordan, Ritter, & Wolf, 2004; Lin & McNichols, 1998). Because such analyst recommendations and forecasts usually help to increase demand for IPO shares, they can thus be perceived as preparation for selling shares. An analyst recommendation is released after the *quiet period*, which lasts from the time when issuers file their Form S-1 until the form is approved by the SEC (U.S. Securities and Exchange Commission, 2015d). In other words, the quiet period begins after the information disclosure stage is completed by underwriting group and lasts until the selling group is allowed to release recommendations and forecasts. Many extant studies have focused on the quiet period and its influence on IPO phenomena. However, because it belongs to neither the tasks of the selling group nor the tasks of the underwriting group, it will be discussed separately in Subchapter 2.3.

Analyst recommendation. In the analyst recommendation, analysts state their recommendations for investors concerning the IPO, such as *buy*, *strong buy*, *neutral*, and *hold* (U.S. Securities and Exchange Commission, 2015a). Such recommendations are based on analysts' personal judgment and opinions and thus may contain cognitive bias, such as overconfidence (Hong & Kubik, 2003), or be influenced by various

conflicts of interest (Michaely & Womack, 1999).

Analysts vary in the extent to which they are influenced by such biases and interests. For general stocks (not necessarily IPO shares), analyst recommendations can be categorized according to the following perspectives. With respect to whether an analyst's recommendation is his or her first for a particular stock, analyst recommendations can be categorized into four types: analyst initiations, upgrades, downgrades, and reiterations, the latter three of which are comparable recommendations subsequent to the initiations (Bradley et al., 2008). Analyst recommendations can also be categorized with respect to the analysts' employers: sell-side analyst recommendations, buy-side analyst recommendations, and independent analyst recommendations (U.S. Securities and Exchange Commission, 2015a). Specifically, sell-side analysts work for stock selling organizations, such as brokers, investment banks, and commercial banks; buy-side analysts work for money management agencies, such as mutual funds and investment advisors; and independent analysts are not affiliated with either buy-side or sell-side agencies (U.S. Securities and Exchange Commission, 2015a). Among the sell-side analysts, those whose employers are also the lead underwriter of the issuers are referred to as the *affiliated analysts*, and the remainder as *unaffiliated analysts*.

These different types of analysts play a role in various phases of an IPO process (Bradley et al., 2008). For instance, an analyst recommendation released immediately after the quiet period belongs to the category of sell-side analyst initiation. After the IPO shares are issued, more analysts will rate the newly issued shares, which can be

buy-side analyst recommendations, independent analyst recommendations, or sell-side analyst recommendations (non-initiations) (Bradley, Jordan, & Ritter, 2003).

One reason for different timing of the release of these recommendations is that, in general, affiliated analysts have greater access to issuer information than do independent analysts. For instance, a recent study found that sell-side analysts had private interactions with issuer management, such as private meetings (Soltes, 2014). Another study that surveyed 365 sell-side analysts reported that private communications with the management represented more useful input than analysts' own research and other sources of hard information (L. D. Brown, Call, Clement, & Sharp, 2015). Another potential reason for differences in timing is that affiliated analysts feel an obligation or pressure to offer recommendations because they work for the underwriters of the issuers. An empirical study showed that affiliated analysts, i.e., sell-side analysts, issue recommendations sooner than unaffiliated analysts. Furthermore, affiliated react more slowly to bad news and are slower to downgrade recommendations but react significantly faster to good news and issuer faster upgrade recommendations (O'Brien, McNichols, & Hsiou-Wei, 2005). O'Brien et al. (2005) offered support for the two abovementioned reasons for the differences in the timing of recommendations.

These different types of recommendations also tend to cause different extents of market reactions. Using a sample of over 7400 analyst recommendations from 1999 to 2000 (bubble period), Bradley et al. (2008) showed different market reaction towards these types of recommendations. They divided the timing of analyst recommendations

into two periods: the first period covered one month after the quiet period, and the second period covered the remaining 11 months of the year. The results showed that, generally, over 90 percent of initiations that were released were made by affiliated analysts in the first period, and a large number of initiations were released by unaffiliated analysts in the second period. Moreover, the market showed little reaction to the initiations from the affiliated analysts but a larger, positive reaction to the initiations in the second period, not only to recommendations from unaffiliated analysts but also those from affiliated analysts.

Interestingly, it seems that the extent of the market reaction is correlated with the time period considered rather than the side employing the analysts. Bradley et al. (2008) also stated that when controlling for the period of issuance, market reactions to the recommendations of affiliated and unaffiliated analysts were essentially the same. Additionally, stronger market reactions were observed when affiliated analysts issued an upgrade or downgrade relative to recommendations made by unaffiliated analysts. Bradley et al. (2008) did not offer an explicit explanation for this phenomenon. However, in my opinion, this market reaction can be explained by information asymmetry and investor expectations for two reasons: 1) investors have little, or no, access to information concerning the issuers during the quiet period, while affiliated analysts are informed; 2) once the quiet period is finished, two scenarios are likely to be triggered.

First, investors might naturally consider themselves in an inferior position relative to underwriters and affiliated analysts, who might also desire to collude with issuers

(M. Li, McInish, & Wongchoti, 2005; C. Schultz, 2005). For instance, Malmendier and Shanthikumar (2014) showed that pressures related to affiliation and investment banking are highly correlated with positive bias in analyst recommendations.

Second, major investors might be unsure of the ethical standards of underwriters and hence might assume that affiliated analysts releasing positive recommendations is a common occurrence after the quiet period. For instance, in a sample of 1,611 IPOs from 1996 to 2000, Bradley et al. (2003) found that 95 percent of the affiliated analyst recommendations were either strong buy or buy in the five-day period after the expiration of the quiet period. In a sample of 683 IPOs, 87 percent of the affiliated analyst recommendations fall into the buy or strong buy categories from 1999 to 2000 (Bradley et al., 2008). According to the regulations of the CFA Institute, the clause “protect the integrity of opinions” states that “members, candidates, and their firms should establish policies stating that every research report concerning the securities of a corporate client should reflect the unbiased opinion of the analyst” (CFA Institute, 2014, p. 27). Although it stipulates that analysts should make an unbiased judgment regardless of whether their employers are involved in underwriting business for the same company, it is highly likely that major investors are unaware of the extent to which affiliated analysts act in accordance with such standards.

Besides the two abovementioned scenarios, M. Baker and Wurgler (2007) found that *investor sentiment*, describing the inaccurate belief about the future performance and investment risks in the stock market, had a stronger influence on stocks with lower capital and those for companies that are younger, less profitable, more volatile, and

growing, all of which are characteristics of IPO companies. Thus investors' sentiments triggered by their inferior position, including both inferior information on issuers and on underwriters' ethics, can be a possible reason for different market reactions. Furthermore, the different extents of market reactions observed in Bradley et al. (2008) can be explained by the following psychological factors.

The first is biased self-attribution. Biased self-attribution can influence investors' confidence in different scenarios (Daniel, Hirshleifer, & Subrahmanyam, 1998a). For instance, investors are more likely to overreact to their private information signals and underreact to public information signals. Due to the high proportion of positive affiliated analysts' recommendations around the quiet period, it is reasonable to assume that investors perceive the positive recommendations as a public information signal and thus underreact. As a result, the market reaction to recommendations issued shortly after the quiet period is weak. Conversely, it is rare for affiliated analysts to downgrade their recommendations; for instance, among the 1,760 recommendations given by analysts affiliated with a lead underwriter or co-managers in an IPO, 420 (approximately 24 percent) were downgrade recommendations (Bradley et al., 2008). Another relatively general example concerns the case of SEO shares; of a sample of 7,401 recommendations from all analysts, 883 (approximately 12 percent) were downgrade recommendations (Lin & McNichols, 1998). Thus, downgrade recommendations are less common than the positive recommendations, which is likely to be perceived as private information. Investors overreact to private information, and thus the market has strong reactions to downgrade recommendations.

The second factor is loss aversion. In essence, loss aversion describes people's stronger sensitivity to losses relative to an equal amount of gains (Tom, Fox, Trepel, & Poldrack, 2007; Tversky & Kahneman, 1991). Regarding the market reaction to downgrade recommendations, investors react more strongly to these than to other recommendations because downgrades symbolize possible loss in most circumstances (except for the downgrade from strong buy to buy). This represents a plausible explanation for the scenario in which the market reacts more strongly to a downgrade than to a general positive recommendation from affiliated analysts around the quiet period but cannot sufficiently explain the scenario in which the market reacts more strongly to a downgrade from affiliated analysts relative to a downgrade from unaffiliated analysts, according to statistics reported by Bradley et al. (2008).

The third factor is trust. It might be the case that investors have less trust in affiliated analysts than in unaffiliated analysts. However, the stronger market reactions to affiliated analysts' downgrade recommendations relative to those of the unaffiliated analysts, as found by Bradley et al. (2008), nearly rules out this explanation because, otherwise, investors would react consistently throughout the period, i.e., the market reaction would remain weak. The asymmetric reactions to recommendations from the same group of analysts indirectly support the other two explanations; in other words, investors can exhibit biased self-attribution or loss aversion bias.

Furthermore, in my opinion, the weak reaction of major investors to analyst recommendations around the quiet period might cause underpricing. Shortly after the quiet period, analyst recommendations and forecasts are the only source of information

about the issuing firms. When major investors underreact and exhibit lower demand for IPOs than how they would react in the remaining 11 months of the year to the same type of analyst recommendations, underwriters can be misled about the real demand for IPOs and set a relatively low initial price. Moreover, according to market efficiency theory (Fama, 1998), when investors do not react according to the available information, market becomes inefficient. Because many studies have noted that underpricing is a result of market inefficiency (Daniel, Hirshleifer, & Subrahmanyam, 1998b; Shayne & Soderquist, 1995; Shleifer, 2000), the market's asymmetric reactions to affiliated analyst recommendations can be perceived as an example of the market acting inefficiently and as one reason for the necessary underpricing or unavoidable underpricing mentioned in Chapter 3.

Additionally, when considering how investors react to analyst recommendations and forecasts in general, the market seems highly inefficient, and investors seem particularly irrational when trading in IPOs. Malmendier and Shanthikumar (2007) found that institutional investors generally react to an analyst recommendation as if the recommendation were downgraded by one level. In other words, they react to strong buy recommendations as if they were buy recommendations, to buy recommendations as if they were hold recommendations and to sell recommendations as if they were hold recommendations. Moreover, Malmendier and Shanthikumar (2007) showed that institutional investors reacted more strongly to downgrade recommendations from affiliated analysts in the context of IPOs. Interestingly, individual investors were more likely to exactly follow analyst recommendations.

Analysts' Behavior. Because most institutional investors are professional investors, such as pension funds, banks, insurance companies, and mutual funds (U.S. Securities and Exchange Commission, 2015f), their reactions to analyst downgrade recommendations indicate that one should not react literally to recommendations.

Indeed, many extant studies show that analysts are generally overconfident, exhibit forecast bias and are positively biased due to self-selection. They might also be influenced by external factors such as reputational concerns, peer pressure or career concerns (Hilary & Menzly, 2006; T. Lim, 2001; Malmendier & Shanthikumar, 2014). For instance, T. Lim (2001) explained the generally positive forecasts of analysts from two perspectives: 1) from the perspective of external factors, analysts may propose overoptimistic recommendations due to pressure from their employers (underwriters) to avoid harming their underwriting business relationships with issuers; they may be influenced by their reputation, which will be further discussed when introducing the all-star analysts; 2) from the perspective of overconfidence, similar to the argument offered by Hilary and Menzly (2006), analysts are irrational and cognitively biased. Specifically, analysts who had predicted earnings relatively more accurately than the median analyst in previous seasons tend to exhibit stronger overconfidence in later seasons: their forecasts tended to become less accurate and drift further from the consequence forecast after four seasons (Hilary & Menzly, 2006). Hilary and Menzly (2006) explained that analysts' overconfidence was the result of an excessive reliance on their private information and discounting of public information. In my opinion, the asymmetric reliance on various sources of information can be further explained by self-

attribution bias and self-serving bias. Self-attribution bias means that people tend to overreact to their personal information and underreact to public information, especially under ambiguous circumstances (Daniel et al., 1998a; Kelley, 1973); self-serving bias means that people tend to attribute their successes to internal factors, such as their skills, knowledge or capabilities, but failures to external factors (D. T. Miller & Ross, 1975).

Furthermore, interesting results were found when simultaneously analyzing analysts' recommendations and forecasts (Malmendier & Shanthikumar, 2014). Following T. Lim (2001), Malmendier & Shanthikumar (2014) categorized the reasons for positive bias into two types: strategic distortion and nonstrategic distortion. Strategic distortion refers to positive recommendations caused by reasons similar to those noted regarding the abovementioned external concerns, and nonstrategic distortion refers to distortions caused by the cognitive biases of analysts. Their results showed that analysts who make positive recommendations due to strategic distortions tend to *speak in two tongues*. Speaking in two tongues refers to the phenomenon whereby analysts issue overly optimistic recommendations but also issue less positive forecasts. In the case of nonstrategic distorters, both recommendations and forecasts exhibit a similar level of optimism.

In my opinion, Malmendier and Shanthikumar (2014) provide an approach to differentiate between the strategic and nonstrategic distortions that cause analysts' overoptimistic recommendations. This approach may help investors in analyzing both stocks and IPO shares. Based on major results from the literature, it is possible to offer suggestions for analyzing affiliated analysts' recommendations and forecasts. For

investors who are interested in a certain IPO, they should first objectively estimate affiliated analysts' recommendations and forecasts. When both recommendations and forecasts show a consistent level of optimism, i.e., positive forecasts and buy or strong buy recommendations, the possibility that analysts are influenced by external factors (strategic distortion) can be eliminated. Malmendier and Shanthikumar (2014) showed that such cases are rare, indicating that this approach can help to exclude the majority of IPOs for which affiliated analysts are strategic distorters. Second, based on Hilary and Menzly (2006), investors should conduct further research on analysts' previous recommendations and forecasts. The more consecutive accurate predictions among the most recent previous predictions, the more likely analysts are to exhibit cognitive biases in their current predictions and vice versa. Finally, investors should make their decisions as if the recommendations were downgraded by one level, as Malmendier and Shanthikumar (2007) note that institutional investors do.

All-star analysts. Based on various principles, there are many different rankings of sell-side analysts. One of the most frequently used ranking by academic studies is the *Institutional Investor All-America Research Team* ranking, which is created annually on the basis of surveys soliciting feedback and votes from buy-side managers, such as chief investment officers from institutional investors, portfolio managers, or buy-side analysts from money management institutions (Bagnoli, Watts, & Zhang, 2008; Clarke et al., 2007; Leone & Wu, 2007). The survey includes questions on sell-side analysts' 1) skills, such as the quality of written reports, the accuracy of earning estimates, and the quality of selecting stocks; 2) knowledge of the industry; and 3)

responsiveness to the investors, such as accessibility and timely communication (Clarke et al., 2007; Leone & Wu, 2007). Another ranking system that is frequently employed is the *best on the street analysts* from *The Wall Street Journal*, where analysts are ranked by the portfolio returns earned during trades according to the analyst's recommendation in the previous year (Bagnoli et al., 2008; P. Brown, Ferguson, & Jackson, 2009; Groysberg, Healy, & Maber, 2011).

All-star analysts are those who located near the top of such rankings (Bagnoli et al., 2008). These analysts have considerable influence in the underwriting industry, and their behavior might influence the likelihood of their employers (investment banks) winning an underwriting deal (Ljungqvist, Marston, et al., 2006). One anecdotal example is that when Merrill Lynch hired an analyst, Phua Young, who was favored by Merrill's client, Tyco, Merrill Lynch immediately won the lead underwriter position in issuing Tyco's \$2.1 billion in bonds on Young's first workday (Clarke et al., 2007).

Despite such stories in the industry, one might nevertheless wonder whether investors can fully rely on the recommendations of these all-star analysts. A study using a sample of the performance and ranking of 42,014 analysts over a 10-year period showed interesting results. First, all-star analysts' persistent excellent performance suggested that they indeed have superior ability instead of being lucky, and they were considered leaders by their peer analysts even before the ranking was published. Second, the results suggested that such superior ability is attributed to analysts' talent rather than their experience (Leone & Wu, 2007). Similarly, using the ranking from the *Wall Street Journal*, Desai, Liang, and Singh (2000) found that all-star analysts outperformed in

making recommendations of large-capital stocks, which are considered comprehensive tasks. Another study found that when all-star analysts changed employers, their recommendations and forecasts results continued to exhibit a similar level of optimism, indicating that they do not give overly optimistic recommendations due to external pressure from employers (Clarke et al., 2007). This might be explained by the finding reported by Hong and Kubik (2003) that all-star analysts have favorable career outcomes concerning job selection, promotion or moving to a more prestigious employer due to their reputation and their relatively accurate previous forecasts.

All-star analysts' overoptimism. When all-star analysts do not exhibit strategic distortion, do they exhibit nonstrategic distortion or cognitive bias such as being overoptimistic? Some studies have shown that analysts can benefit from being optimistic. For instance, analysts who are optimistic were found to be rewarded by working in more prestigious investment banks (Hong & Kubik, 2003). Ellis, Michaely, and O'Hara (2004) found that underwriters with more optimistic analyst recommendations tend to attract larger underwriting deals (as cited in Boudry, Kallberg, & Liu, 2011). However, overoptimistic analysts were found to be worse off by increasing the likelihood of terminating their careers and reducing the likelihood of promotion (Leone & Wu, 2007). One anecdotal example supporting this argument is that in April 2003, 10 of the largest Wall Street investment banks reached a settlement by paying \$1.4 billion in compensation and penalties due to issuing overly optimistic recommendations and forecasts to attract investment banking clients (Agrawal & Chen, 2008).

In my opinion, it seems that studies conducted before 2004 tended to show that overoptimism was a preferable trait for analysts. For instance, the sample used by Hong and Kubik (2003) was from 1983 to 2000, including the internet bubble period (1999 to 2000). Thus, it might be reasonable to assume that analysts were incentivized to issue overly optimistic recommendations before the bubble burst; these incentives might be opportunities to work in a more prestigious investment bank or the likelihood of attracting more underwriting business for their current employer. A study specifically focusing on the period from 1996 to 2000 showed that, beginning in 1998, analysts made more optimistic recommendations, especially for internet stocks; positive correlations were found between the level of optimism in the recommendations and the subsequent return on the related stocks (O'Brien & Tian, 2006). Thus, from another perspective, the internet bubble can be partly attributed to analysts' overoptimistic recommendations. Additionally, many studies showed that analysts exhibit strong herd behavior when making forecasts and recommendations. Specifically, analysts tend to release both forecasts and recommendations that are similar to those previously released by other analysts (Clement & Tse, 2005; Trueman, 1994; Welch, 2000). As a result, it can be assumed that before the internet bubble, overoptimistic analysts were likely to be rewarded with more opportunities and that this optimism was amplified by herd behavior among the analysts, which ultimately led to the internet bubble. U.S. federal securities regulators sought to put an end to such behavior by charging the largest 10 Wall Street investment banks in 2003 (Agrawal & Chen, 2008), which, in my opinion, directly influenced analysts' overoptimistic behaviors. As a result, subsequent all-star

analysts were found to be less overoptimistic than the average analyst (Leone & Wu, 2007).

Other characteristics of all-star analysts. Despite the disagreements concerning all-star analysts' overoptimism, scholars agree that all-star analysts are more willing to take risks and are bolder than other analysts. One study showed that bold forecasts were more accurate than herding forecasts, as bolder analysts tended to incorporate their private information more completely, and thus, their forecasts tended to be more coherent (Clement & Tse, 2005). Bolder analysts tend to be perceived as leaders by their peer analysts and hence more likely to be rated as all-star analysts (Leone & Wu, 2007).

To conclude, in the first stage of underwriters' selling activity, analysts exert a major influence on investors' decisions concerning whether to purchase an IPO and, in some instances, even on issuers' decisions concerning whether to cooperate with an investment bank for their IPO issuance before beginning selling. Furthermore, investment banks ultimately consist of individuals, including analysts. Individuals' characteristics and cognitive biases always influence their intellectual output, here, analyst forecasts and recommendations. In the following subchapter, the road show conducted by selling group will be discussed.

2.2.2 Road show

A road show is presented by issuers and underwriters to large and important

investors such as institutional investors, money managers and portfolio managers⁶ (Doring, 2013; Schulte & Spencer, 2000). Road shows usually take place before setting the initial price and are generally held in regional, national or international large cities, depending on the number of new issues and locations of important investors (Schulte & Spencer, 2000). The process usually includes 1) the lead underwriter explaining the amount of the issuance, the initial price range and future usage of capital raised by the IPO; 2) the issuing firms' CEO presenting basic information on the firm, such as current profitability, expected future development, main competitors and market shares; and 3) the CEO and lead underwriter participating in one-on-one meetings with important potential investors, in an effort to obtain information on investors' expected purchasing volumes and the price they are willing to pay (Schulte & Spencer, 2000). For instance, Goldman Sachs' road show for its own IPO in 1999 included 63 one-on-one meetings and 27 group meetings, invited a total of approximately 1,100 institutional investors and covered 38 cities (R. Aggarwal, 2003). In addition to collecting information relating to investors' demand for IPO shares, which helps underwriters to set the initial price in the next stage, a road show is also intended to promote new issues. One study showed that investors' demand usually increased after the road show (D. Zhang, 2004). Specifically, by using 30-second content-filtered video clips of road show presentations from the CEOs of issuing companies, that study showed that the first impression made by a CEO, including trustworthiness, competence, and even attractiveness, is positively correlated with the market value in the secondary market (Blankespoor, Miller, &

⁶ According to Schulte & Spencer (2000), generally, individual investors are not included in the road show.

Hendricks, 2015). In other words, CEOs making positive impressions during the road show tends to decrease the likelihood of underperformance. Additionally, as the one-on-one meetings with large investors have become popular in road shows, studies have found other advantages of such meetings. For instance, Sherman (2000) and Schulte and Spencer (2000) found that one-on-one meetings help to create long-term relationships between institutional investors and underwriters.

2.2.3 Book building

After the road show, underwriters usually obtain information about the preliminary demand for IPO shares. The method used by underwriters to assess demand is call *book building* on Wall Street (R. Aggarwal, 2003). Part of the road show'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). Generally, if demand is high, underwriters will set a relatively high initial price. Hence, when investors offer completely accurate information concerning their demand, the initial price will consequently be driven higher. Thus when investors need to pay more in the future for being open and honest about their purchasing intentions, it is likely that they will acquire something in return for their information. It is reasonable to expect that the more accurate their information is, the more they should be compensated by the issuers and the underwriters (Ritter & Welch, 2002). Thus, scholars have noted that underpricing is one approach to

compensate investors for their information (Derrien & Womack, 2003; Sherman & Titman, 2002).

Empirical studies have also focused on the relationship between initial price adjustments and investors' demand. An initial price adjustment means that the final initial price exceeds the initial price range disclosed during the road show. For instance, for shares involved in an initial price adjustment, investors demand had increased and underpricing became more significant after the adjustment (Hanley, 1993). Hanley (1993) argued that the reason for this phenomenon was that underwriters partially adjust the initial price and intentionally set the final price lower than it should be based on the demand information collected during the road show.

However, in my opinion, stronger underpricing might result from the consequences of the initial price adjustment because institutional investors' demand is dynamic: it is highly likely that investors will purchase more after the initial price adjustment. In addition to the abovementioned reason for institutional investors' reluctance to fully reveal their demand during the road show, they might also be uncertain of the quality of the new issues and the future performance of IPO shares because during the road show stage, issuers should have superior information about their own firm relative to the information held by outside investors. Hence, investors are in inferior position and may be conservative in purchasing the new issues. According to Burt (1982), people are more likely to seek others' opinions as a reference in ambiguous circumstances (as cited in Rook, 2006). Consequently, it can be assumed that institutional investors tend to herd while purchasing IPOs. Several studies have

focused on institutional investors and herd behaviors. For instance, using data from the Korean stock market, Woochan Kim and Wei (2002) found that although individual investors exhibited stronger herd behavior than institutional investors, foreign institutional investors were more likely to herd than were domestic investors due to a lack of information. Mutual funds also exhibited behavior when there were consensus changes in analysts' recommendations in the stock market, and this herd behavior was especially significant when these recommendations were downgrades, due to fund managers' career concerns (N. C. Brown, Wei, & Wermers, 2013). These two studies show that although institutional investors are more professional, they nevertheless exhibit herd behavior, especially when they are exposed to ambiguous situations or are driven by incentives such as career concerns. Thus, in my opinion, it is reasonable to assume two sequential scenarios. First, institutional investors are generally conservative when purchasing a large number of IPO shares due to their inferior information and are unwilling to give away accurate demand information, both of which lead the expected demand estimated during the road show to be lower than the actual demand. This can explain the existence of underpricing without an initial price adjustment. Second, institutional investors exhibit herd behavior when they assume that their peers have strong demand for the IPO shares, and their herd behavior might be more pronounced when they have career concerns, such as being unwilling to underperform their peers. Thus the demand for shares will be driven up and so will the stock price. Combining these reasons provides a partial explanation of the stronger underpricing observed after an initial price adjustment.

In my opinion, based on these assumptions, two hypotheses can be proposed: 1) when IPOs have a final initial price that exceeds the initial price range, IPOs that are allocated to larger or more prestigious institutional investors exhibit a greater extent of underpricing; 2) when IPOs have a final initial price that exceeds the initial price range, less informed institutional investors are likely to increase their demand for the IPO shares. Specifically, the first hypothesis is based on the results of two studies. First, institutional investors exhibit stronger herd behavior when career concerns are stronger (N. C. Brown et al., 2013); second, more prestigious investment banks and analysts have stronger reputational concerns (Ljungqvist, Marston, et al., 2006). Hence, larger and more prestigious institutional investors should also have stronger reputational and career concerns, which might lead to stronger herd behavior. Thus, when such investors perceive that their peers have purchased a large quantity of a certain IPO, they might in turn increase their own purchase. Herd behavior makes the actual demand in the secondary market exceed the expected demand, which generates a greater level of underpricing. If the first hypothesis were accepted, the following conclusions can be drawn: for an IPO with an initial price that exceeds the price range, part of the underpricing is caused by herd behavior by institutional investors due to their career and reputational concerns.

The second hypothesis is based on the argument from Burt (1982) and Rook (2006) that people tend to engage in herd behavior when they are less informed. A dummy parameter describing whether an institutional investor had a one-on-one meeting with the issuer during the road show can be used differentiate informed institutional

investors from uninformed investors. A similar parameter was used by D. H. Solomon and Soltes (in press), who found that investors that met privately with senior management traded more informatively during the period surrounding the meetings. Hence, institutional investors who are invited to participate one-on-one meetings can be considered informed investors and thus will exhibit less herd behavior. Less herd behavior means that such investors are less likely to change their demand for the IPO shares, which can be measured by the number of shares purchased by institutional investors after the initial date. If the second hypothesis were accepted, it would indicate that for an IPO with an initial price that exceeds the price range, part of the strong underpricing is caused by herd behavior by institutional investors due to their lack of information.

To conclude, underwriters begin their book building process during the road show, and the process continues until underwriters manage to set the final initial price (Sherman & Titman, 2002). Although there have been consistent doubts concerning proficiency of the book building process, such as scholars arguing that it decreases the total proceeds from an IPO issuance compared with an allocation of shares at a fixed price (Benveniste & Busaba, 1997; Busaba & Chang, 2010) or that it creates greater underpricing compared with an allocation of shares through an auction (Derrien & Womack, 2003; Kaneko & Pettway, 2003), it is nevertheless the most frequently used and preferred method in the stock market at present. The two alternatives approaches for setting the initial price are the *fixed price* and *Dutch auction* methods, which have been adopted in a few countries, but were gradually driven out of the market by the

book building method, for instance in Japan and most European countries (Kutsuna & Smith, 2004; Sherman, 2005). Hence, they will not be the focus of this discussion. The next subchapter will directly focus on the results of book building, which are initial price determination and share allocation. Due to the significance of these outcomes, they are presented in a separate subchapter.

2.2.4 Determination of the initial price and share allocation

Because underwriters and issuers determine the initial price and share allocation according to the results of the book building process, one direct method to study how such decisions are made is to examine the books. For instance, by examining such books from 39 international equity issuances, Cornelli and Goldreich (2001) found that institutional investors that provided more information during the road show received more shares as a reward for helping underwriters to set the initial price, similar to findings by Ritter and Welch (2002) and other scholars (see Chemmanur, 1993; Corwin & Schultz, 2005; Sherman, 2000). Additionally, in their study, three types of investors were found to be favored by underwriters and to receive more shares: 1) investors that previously in a relatively large number of IPO issuances, 2) investors that provided revised bids while the book was still open, and 3) domestic investors.

Similarly, by studying the books from 63 international equity issues, Cornelli and Goldreich (2003) found that underwriters relied substantially on information provided by investors when setting the initial price. Specifically, the loyalty of institutional investors, the number of subscriptions, and public information were all found to affect

the initial price. Bids offered by loyal institutional investors (measured by the frequency of past IPO participation) tend to have a considerable influence on the initial price, and bids requiring a larger number of shares also strongly affect the initial price. Public information indirectly affects the initial price by influencing the bids offered by institutional investors. Cornelli and Goldreich (2003) also described the process whereby underwriters determine the initial price according to the books they had built, which, interestingly, does not strictly follow a certain rule or specific formula. Once the book is closed, underwriters develop a demand curve according to the bids (expected demand) from investors, and the price is determined by the information reflected in this curve. Both underwriters and issuers are involved in this process, and thus both parties have decision-making power.

One might argue that the samples used in these two studies are relatively small. However, due to the limited access to underwriters' books, very few studies can be conducted by directly examining the books. This is also one reason that the mechanisms of share allocation and initial price determination remain unclear and can be only measured by textual information instead of numerical information (Bertoni & Giudici, 2014).

As a result, most studies focusing on share allocation can only be conducted indirectly by examining the results of share allocations, instead of analyzing the process (Nimalendran, Ritter, & Zhang, 2004). For instance, R. Aggarwal (2003) stated that most IPO shares are allocated to loyal institutional investors or large individual investors, as they are considered to be less likely to flip the shares. The proportion of

IPO shares distributed to these investors can vary from 60 percent to 90 percent of the total issuance amount (R. Aggarwal, 2003). Similarly, other examples focusing on underwriters indicate that institutional investors are favored over individual investors during the allocation of IPO shares, as reported by Pulliam and Smith (2000), Pulliam, Smith, and Gasparino (2000) and R. Smith and Pulliam (2000) (as cited R. Aggarwal et al., 2002). The phenomenon of share allocation revealed by most studies whereby underwriters favor one group of investors over another violates certain rules of the SEC and Chartered Financial Analyst Institute (CFAI). For instance, the *Standards of Professional Conduct* for CFA chart holders, who are the main participants in most underwriting transactions of prestigious investment banks, requires that clients be treated fairly. Especially in IPO allocation, distributing hot issues only to favorite clients will likely lead to a CFA chart holder facing investigation by the CFA Disciplinary Review Committee (CFA Institute, 2014). Moreover, the SEC and the U.S. Attorney's office specifically investigate whether underwriters intentionally allocate hot IPO issues to their favored clients (R. Aggarwal et al., 2002).

In my opinion, the confidentiality of the books allows underwriters to allocate shares and determine the price following their preferred approach. Underwriters might argue that institutional investors and large individual investors are less likely to flip the shares, and hence distributing shares to them can help to protect the fragile price of IPO shares. However, there is a thin line between loyal clients and favored clients. On the one hand, the loyal clients and favored clients might have a reciprocal causation effect, whereby loyal clients are indeed underwrites' favored clients due to their past positive

collaboration experience, and favored clients can become loyal over time because they develop positive relationships with underwriters. On the other hand, underwriters tend to intentionally build long-term relationships with institutional investors due to their business concerns, a finding that has also been supported by many empirical studies (Gondat - Larralde & James, 2008; Griffin et al., 2007; Sherman, 2000; Stoughton & Zechner, 1998).

As a result, I believe that it is always difficult to disentangle the factors driving underpricing whenever the process for setting the initial price and allocating shares is neither transparent nor strictly regulated, i.e., the book building process. It is even possible that institutional investors that are invited to participate in one-on-one meetings have been already pre-selected according to underwriters' preferences. Paradoxically, over time, such a pre-selected-participants method (book building) has driven the other two methods (the fixed-price and Dutch auction methods) out of the market, despite that the other two methods both have relatively clear rules on share allocation and initial price determination. In short, these two methods provide all investors with a relative open and fair platform for shares distribution, but they have nevertheless been driven from the market (Biais & Faugeron-Crouzet, 2002; Wilhelm, 2005). In my opinion, this is indirect evidence of market inefficiency because a less fair method has become widespread over time.

Another relevant question is the following: what would happen if the shares were fairly distributed to every investor who applied to participate in the IPO? Will the fairest method also be the best one? My answer would be yes only if all of the investors who

receive IPO shares are non-speculators; in other words, investors will not immediately flip IPO shares after the initial date.

The advantages and disadvantages of flipping activities have been described from various perspectives. For instance moderate flipping activity can increase liquidity in the secondary market and facilitate stock price discovery; excessive flipping activities are likely to have detrimental effects on new issues. However, R. Aggarwal et al. (2002) showed that individual investors flip to a greater extent when the initial price exceeds the initial price range; in other words, individual investors decrease the likelihood of price stabilization. For instance, for cold IPOs, when investors immediately flip the IPO shares after the initial day, the supply of the shares will surge, and the direct result is that the price of IPO shares will decline. Such phenomena can be magnified by herd behavior by investors when the available information is limited, i.e., in IPO trading (Bikhchandani et al., 1992; Shiller, 1995). A high volume of flipping activities can substantially damage the initial price even for stocks that might have promising future performance (R. Aggarwal, 2003; Amihud et al., 2003; Krigman et al., 1999). Furthermore, flipping activity was found to be positively correlated with the amount of underpricing, i.e., hot IPOs are more likely to be flipped. Consequently, to some extent, the root of flipping activities lies in the amount of underpricing (R. Aggarwal, 2003; Bayley et al., 2006).

As stated in Chapter 2, underpricing can be categorized into two types. The first is unavoidable underpricing: for example, when underpricing functions as a signal to differentiate high-quality IPO companies from low-quality ones due to information

asymmetry (Welch, 1989); when underwriters set a lower price to attract speculative investors thereby allowing flipping and the creation of high liquidity for the IPO shares after the initial date (Boehmer & Fische, 2000); or due to the attention-driven effect of the individual investors in the aftermarket who are net buyers of IPOs (Barber & Odean, 2008). The second is intentional underpricing: this is created by underwriters for the purpose of compensating their favored institutional investors (R. Aggarwal et al., 2002), compensating institutional investors for providing accurate information about the market demand during the book building process (Sherman & Titman, 2002), or forming long-term relationships with certain intuitional investors due to business concerns (Sherman, 2000). Thus, even when the second aspect of underpricing is eliminated, the share of underpricing generated by market inefficiency will remain. As a result, as long as the market is inefficient, underpricing will always exist due to unavoidable underpricing, which might have the tendency to lead to excessive flipping activities by speculative investors if control is not exercised over the allocation of shares to primary investors. Flipping activities are one reason that underwriters cannot distribute shares equally to every investor if they wish to protect IPOs from herd behavior by investors, which is another phenomenon of market inefficiency. To conclude, market inefficiency leads to unavoidable underpricing, and then flipping activities occur, and finally, underwriters have to exclude some investors, which is why the book building method is the only method that has persisted over the decades (Kutsuna & Smith, 2004; Sherman, 2005).

Because, in practice, it is difficult to differentiate the first type of underpricing

from the second type, one bold approach to eliminating the second type of underpricing (intentional underpricing) might be to allocate the shares fairly to all investors. However, as stated above, such a fair allocation is likely to create considerable flipping activities due to the increased number of speculators. As a result, the first type of underpricing will remain as long as the market is inefficient, and the elimination of the second type of underpricing is likely to cause stronger flipping activities. In short, I believe that underpricing will always exist as long as the market is inefficient in the form of asymmetric information, low liquidity and irrational investors.

2.2.5 Market making

The broad concept of market making begins when issuers decide to launch IPOs. The main focus at this stage is to attract underwriters and institutional investors to participate in the initial stages of IPO issuance, as previously stated, the bake-off stage and the road show stage (Bahadir, DeKinder, & Kohli, 2015). However, the market making that will be explained in this section will focus on one function of the selling group in underwriter syndicate. It includes attracting investors to purchase IPO shares after the initial date, maintaining the liquidity of the transfers, and preventing strong price fluctuations of the IPO shares (Ellis et al., 2000; Ellul & Pagano, 2006; Ritter & Welch, 2002).

Specifically, after analyzing purchasing activities three months after the initial date using a sample of 559 IPOs, Ellis et al. (2000) found that lead underwriters were the main market makers during these three months, and while co-managers also

participate in market making, their effect is rather subtle. Those authors also identified the functions of lead underwriters as follows: 1) lead underwriters were found to function as active market makers by handling an average of 60 percent of the total amount of shares in the first days after the initial date and 50 percent in the first three months; 2) lead underwriters were found to function as purchasers to stabilize the share price after the initial date. For instance, they purchased on average 4 percent of the total number of shares and 22 percent of the total number of shares when the first-day trading price fell below the initial price. In other words, if the IPO is a cold issue, its lead underwriter has to function as an institutional investor that simulates demand and attempts to prevent the stock price from declining below the initial price. As a result, lead underwriters have to bear the risk of holding an excessive number of shares of cold IPOs in their inventory. This might appear to resemble the firm commitment deal explained in Chapter 2, which requires underwriters to purchase all IPO shares regardless of whether they are able to be sold in the primary market (Dunbar, 1998). However, it is different. Because a firm commitment deal requires underwriters to pay the issuers out of the total proceeds (the number of shares issued multiplied by the final initial price) before the initial date (Ritter, 1987). Hence, lead underwriters' purchasing behavior after the initial date is not included. Based on the existing literature, in my opinion, there are several incentives for underwriters to purchase IPO shares after the initial date.

Compensation Concerns. Underwriters receive three main types of compensation. The first is the direct compensation paid by issuers, which is usually 7 percent of the total

proceeds from an IPO issuance. This compensation will be paid to the entire syndicate when the IPO is complete (H. C. Chen & Ritter, 2000). Using a sample of 4,780 IPOs, Torstila (2001) showed that the 7-percent proceeds received by the entire syndicate was approximately divided into shares of 20, 60, and 20 percent, to the management group, selling group, and underwriting group, respectively; the concession to the selling group represents a larger proportion if the IPO is a hot issue with a large first-day rate of return. This distribution method is broadly used by most underwriter syndicates; thus some studies call this the *20/20/60 split* (Cheolwoo Lee, 2012). Hence, the selling group receives the largest proportion of compensation in underwriting syndicate. In my opinion, this aspect of compensation does not necessarily drive underwriters to purchase shares after the initial date because it is paid ex ante. However, this aspect of compensation does encourage underwriters to sell as many shares as possible, even to themselves when necessary. Thus some underwriters might already hold a large block of shares before the initial date, and those underwriters that have firm commitment deals with issuers are even more likely to do so. Second, underpricing, as stated previously, can be interpreted as a hidden means of compensating underwriters because in most circumstances, underwriters purchase some or all of the IPO shares at the initial price before the initial date (Carter & Manaster, 1990; Dunbar, 1998). This aspect of compensation might incentivize underwriters to create a large amount of underpricing, which can be realized in two ways: setting a lower initial price or driving the share price higher after the initial date. In addition to the arguments of Ellis et al. (2000), underwriters' purchasing behavior has been studied by other scholars. For instance, a

study conducted in a single investment bank found that the lead underwriter purchased approximately 15 percent of all shares with the aim of supporting the initial price in the first two days after the purchase, and the subsequent repurchasing activities were primarily intended to create profitability and maintain the liquidity of shares in the market (Boehmer & Fische, 2004). R. Aggarwal (2000) found that underwriters used more than the purchasing method to stimulate the stock price after the initial date; other methods, such as penalizing clients who flip the shares and selectively using the over-allotment option, are also used to stabilize the stock price. One way to penalize investors that are flipping shares is for underwriters to deprive them of their concession while the shares are sold, according to R. Aggarwal (2000). Another approach is to ban investors that flip from future IPO allocations (Stojkovic, 2015). Third, over-allotment, which allows underwriters to sell more shares (up to 15 percent more) than the offer size indicates, can also profit underwriters. Because over-allotment is an option that underwriters can choose whether to exercise, as stated in Chapter 2, it is also known as the green shoe option (Hogan, 2000; Hogan, Olson, & Kish, 2001). Intuitively, over-allotment helps underwriters to decrease the risk of holding excessive shares of unfavorable IPOs. For instance, if the market price declines below the initial price, underwriters can repurchase the shares from the market and sell to the extra 15 percent of investors at the initial price. Exercising the over-allotment option, on the one hand, can help the underwriter to compensate for the loss due to price decreases if an IPO is a cold issue. On the other hand, it stimulates the demand for IPOs after the initial date. R. Aggarwal (2000), using a sample of 114 IPOs, showed that over 50 percent of

underwriters exercised the overallotment option, with an average overselling amount of 11 percent of the issuance size. These shot positions (the overselling amount) were made up within approximately 17 days of the initial date, with a total number of 22 transactions. Interestingly, her data showed that not all IPOs that were over allocated were cold issues because, on average, approximately 4 percent of the losses were experienced due to stock prices that were higher than the initial price. Other studies have also found that the overallotment option benefits both underwriters and issuers (see Chowdhry & Nanda, 1996; D. Zhang, 2004). As a result, the overallotment option can either increase or decrease underwriter compensation. Although the overallotment option is not necessarily compensation for underwriters, it was designed to protect underwriters from suffering losses from issuing cold IPOs. Moreover, it could be the main reason that underwriters exhibit strong purchasing activity after the initial date (R. Aggarwal, 2000).

Reputational Concern. To date, few studies have directly focused on the relationship between underwriter reputation and purchasing behavior after the initial date. One of the most relevant of this limited number of studies found that underwriter reputation is moderately correlated with price stabilization activities and operationalized whether the overallotment option was exercised to measure price stabilization activities (Logue et al., 2002). Interestingly, that study found that price stabilization activities were positively correlated with the long-term return of IPOs, and the overallotment option was found to have a significant effect on the 36-month rate of return. In my opinion, the relationship between underwriter reputation and underwriter purchasing activities

after the initial date is an interesting topic because of its practical consequences. For instance, if the lead underwriter's reputation is positively correlated with purchasing activities after the initial date, for IPOs made through prestigious investment banks, there will be considerable demand in the short run after the initial date because, most likely, the prestigious lead underwriter will purchase a large number of IPO shares and stimulate market demand. As a result, in such a case, investors should avoid purchasing shares shortly after the initial date for IPOs that use prestigious underwriters.

2.3 Collaboration among the groups in the IPO process

No recent study clearly states how each group works and collaborates in different phases throughout the initial public offering process. One of the possible reasons for this lack is that, regarding underwriters, most contributions have tended to study the syndicate as a whole, with the leading underwriter serving as the representative of the three groups. Another possible reason is that it only becomes practical to divide the syndicate into groups when analyzing how the syndicate divides the compensation. In my opinion, however, this gap might offer the possibility examine the underwriter syndicate in greater depth by determining the group with the most important influence on underpricing and which group might have the strongest effect on issuers' long-term performance.

Based on the definition of different syndicate groups proposed by Torstila (2001), together with the detailed description of initial public offering procedures from various studies, I would like to present how these groups cooperate from the perspective of the

underwriting syndicate in seven phases. Because most of the phases were addressed in the previous subchapters when introducing the functions of the different groups, in this subchapter, these functions will simply be mentioned to maintain a consistent analytical structure, which also helps to form a complete picture of the different phases according to the timeline.

First phase: the bake-off stage. This stage typically occurs six months before the IPO. In this stage, the lead underwriter and co-managers from the management group are selected by issuers and begin to choose other members of the syndicate. The main task in this stage for potential lead underwriters is to persuade issuers to cooperate with them by providing personalized service, recommending strategies and competing with other underwriters to win the competition (Krigman et al., 2001). In my opinion, during this stage, there is no conflict of interest between issuers and underwriters, and as Krigman et al. (2001) stated, it is highly likely that there is substantial handholding between issuers and underwriters. Conflicts of interest only exist among underwriter candidates due to the highly competitive contest for the lead underwriter position (Jenkinson & Jones, 2009a). Interestingly, once issuers have chosen a certain investment bank as the lead underwriter and the group of banks that will be included in the syndicate, the competition will cease, and the bargaining power of underwriters will be weakened. According to Jenkinson and Jones (2009a), a European IPO employed an innovative method to prevent the issuer from losing its strong bargain position. In this IPO, the roles of the underwriter syndicate were separated into different entities, instead of the traditional approach whereby the lead underwriter plays a central role in all three

groups. According to this method, one advisory bank was hired to offer advice concerning the size of the issue, the price range of the shares and allocation of the shares, and it also advised issuers regarding which banks should be invited to participate in book building and share allocation. In the next stage, different banks (not necessarily the advisory bank) are hired to allocate the shares shortly before the initial date. This method maintains the competition among the banks because future uncertainty incentivizes the advisory bank to engage in due diligence and suggest a relatively fair price for the IPO shares. The approach of Jenkinson and Jones (2009a) offers the possibility to derive an understanding of the roles in an underwriting syndicate that differs from the traditional method, in which the three different groups are separated according to the perspectives of both function and entity. However, in practice, this method has not been widely used, and there is little data available to empirically test whether such an approach can help to reduce the extent of underpricing. In my opinion, this method should be considered an alternative to the traditional method in the bake-off stage when issuers wish to decrease the level of underpricing.

Second phase: preparation stage. As stated previously, the underwriting group is primarily responsible for this stage, including preparing the registration statement, which is transformed into the primary prospectus, and providing other documents for the SEC and the public (Ellis et al., 2000). In terms of timing, this phase begins with the underwriting syndicate preparing to file applications for the IPO and concludes when the documents are submitted to the SEC, i.e., the filing of IPO. Because this phase was discussed in depth in Subchapter 2.1, it is unnecessary to discuss it further here.

Third phase: quiet period. The quiet period begins with the filing of IPO and lasts for 25 (before 9 July, 2002) or 40 calendar days (after 9 July, 2002) (Highfield, Lach, & White, 2008). During this phase, the SEC prohibits issuers and underwriters from “publishing opinions concerning valuation and from making forward-looking statements regarding earning, revenues, and similar items” (Bradley et al., 2003, p. 1). However, the SEC has modified these restrictions by liberalizing information; for example, “all reporting issuers are, at any time, permitted to continue to publish regularly released factual business information and forward-looking information” (U.S. Securities and Exchange Commission, 2005, p. 51) beginning on 1 December, 2005. Scholars from different disciplines have argued that the creation of the quiet period rule and empirical cases have challenged whether the reform has been practically applied by underwriters and issuers. For instance, Heyman (2013), considering a legal perspective, proposed that the quiet period rule is unlikely to succeed a challenge on the basis of the free commercial speech doctrine provided by the First Amendment to the U.S. Constitution. One of the well-known practical cases calling into question the fairness of the quiet period rule to small investors is that, during Facebook’s IPO, Morgan Stanley (the lead underwriter of Facebook IPO) decreased its revenue estimates and outlook for Facebook without informing retail investors. This was likely one of the reasons for the poor performance of Facebook’s IPO during its first couple of months, where the initial price was \$38 per share on 18 May, 2012 and its closing price had declined to approximately \$20 per share by 20 August, 2012 (Nasdaq, 2015). When Facebook and Morgan Stanley were sued by some of the small investors, they argued

that the quiet period rule had prevented them from disclosing such a detailed forecast (Cedergren, 2015).

The SEC has made two major changes to the quiet period rule. The first change was on 9 July, 2002, when NYSE Rule 472 and NASD Rule 2711 extended the quiet period from 25 calendar days to 40 calendar days (Lach, Highfield, & Treanor, 2012). The second change was on 1 December, 2005, when the SEC relaxed its restriction on the types of information that had been previously prohibited (U.S. Securities and Exchange Commission, 2015d).

In my opinion, from a psychological perspective, the quiet period itself can result in high demand from investors because tensions are accumulated during this stage. The psychological support for this phenomenon is known as *psychological reactance*, which was proposed by Brehm (1966), stating that when a person's freedom is suppressed or decreased, he or she will become "motivationally aroused" (p. 378). In case of the quiet period, when investors have no access to relevant information, they are deprived of their freedom to be informed, and the longer the quiet period is, the greater the extent to which their freedom will be decreased. As a result, the longer the quiet period is, the higher the demand from investors might be, especially among small investors because they might regard themselves as inferiors in the initial market whose freedom to purchase IPO shares had already been eliminated by the underwriters. Thus, the quiet period rule can actually be one of the factors responsible for underpricing. Both practical and empirical evidence has shown that the value of new shares increases after, or even shortly before, the expiration of the quiet period (Bradley et al., 2003;

Bradley et al., 2004). A sample of 1,161 IPO companies from 1996 to 2000 was examined with the finding that the average first-day return was 37.4 percent (Bradley et al., 2003). Such a high first-day return was due to the particularities of the internet bubble period (from 1999 to 2000), when the average first-day return soared to 89 percent (Ljungqvist & Wilhelm, 2003). To eliminate the unusual return caused by the market, Bradley et al. (2004) conducted an extended study with 94 observations from January 2001 to mid-July 2002 and found a 13.9 percent first-day return. Note that the quiet period in these two studies lasted for 25 calendar days. After the quiet period was extended to 40 days, Highfield et al. (2008) conducted a follow-up study using a sample of 267 IPO companies from 2002 to 2005; however, they focused on how analyst predictions were influenced by the extension of the quiet period. There are many factors that might have important effects on IPO underpricing, and while studies have focused on the amount of underpricing before and after the quiet period was extended, it is nevertheless difficult to disentangle the effects of these factors. Thus it would be ideal to perform a simulation study in the lab in which only the length of quiet period is manipulated. The expected results would be that the group exposed to a longer quiet period is likely to have a higher demand for IPO shares. If these results were obtained, then the SEC should reconsider the wisdom of having a quiet period.

Again, in my opinion, the second change to the quiet period was rather formalistic because the new rules did not clearly distinguish between the types of information that could be disclosed and those that could not. Wording such as “regularly released factual business information and forward-looking information (U.S. Securities and Exchange

Commission, 2015d, p. 51)'' is ambiguous and creates asymmetric information between issuers and investors. From my perspective, underwriters might intentionally exploit such information asymmetry and thus could harm retailer investors' interests, as in the example of Facebook and Morgan Stanley. In instances where laws, rules and regulations are not applicable, moral standards become the primary factor protecting vulnerable investors in the stock market.

Fourth phase: release of analyst recommendations and forecasts. After the quiet period expires, analysts are allowed to release recommendations and forecasts concerning issuing companies' future development and potential earning abilities (Lin & McNichols, 1998). In my opinion, beginning with this phase, the remaining tasks performed by the underwriting syndicate should be regarded as the functions of the selling group, as that group focuses on selling IPOs. The details of this phase were provided in Subchapter 2.2.1.

Fifth phase: road show and book building. Because in the book building method (which is the most common), the road show and book building processes usually occur within a relatively brief period (Cornelli & Goldreich, 2001), I combine them into one phase. For details on this phase, see Subchapters 2.2.2 and 2.2.3.

Sixth phase: initial price determination and share allocation. Similarly, the determination of the initial price and share allocation are closely related, both in terms of timing and on a material basis, because according to the book building method, underwriters will develop a demand curve according to the book and decide both the initial price and the share allocation (Hanley, 1993). Details on the share allocation and

initial price determination can be found in Subchapter 2.2.4. One additional factor that influences the initial price, which is also beyond the control of both issuers and underwriters, are the market conditions during the issuance period. One of the indirect indicators affecting the initial price level is the number of IPO companies during a certain period. Data provided by Ritter (2014a) offer empirical support for this, stating that during the year 2008, when the financial crisis began, there was a 90 percent average decrease in the number of IPO companies compared to other years. Additionally, during years characterized by hot issue markets, many more companies went public compared to normal years. For instance, during the internet bubble (1999 to 2000), 858 companies went public, which is more than 50 percent of the number of companies that went public from 2001 to 2014 (Ritter, 2014a). The influence of the market on the initial price is beyond the control of underwriters and issuers, but it is closely related to the third party involved in the IPO process: investors. Questions such as how can investors' emotions, biases and trading behaviors influence the market to such a great extent will be discussed in Chapter 4.

Seventh phase: market making. As stated in Subchapter 2.2.5, market making takes place after the initial date and primarily concerns lead underwriters' purchasing activities. The effect of such purchasing activities has been explained from both the issuer and underwriter's perspectives and will be explained from the investors' perspective in Chapter 5.

Generally, this chapter describes the IPO process from the perspective of underwriters, which form the three groups of an underwriter syndicate: the

management group, underwriting group and selling group. The functions of the three groups are introduced in sequential order, where underpricing and underperformance are further explained (Figure 7). In the next chapter, IPOs will be discussed from the perspective of the third main party in the IPO process: investors.

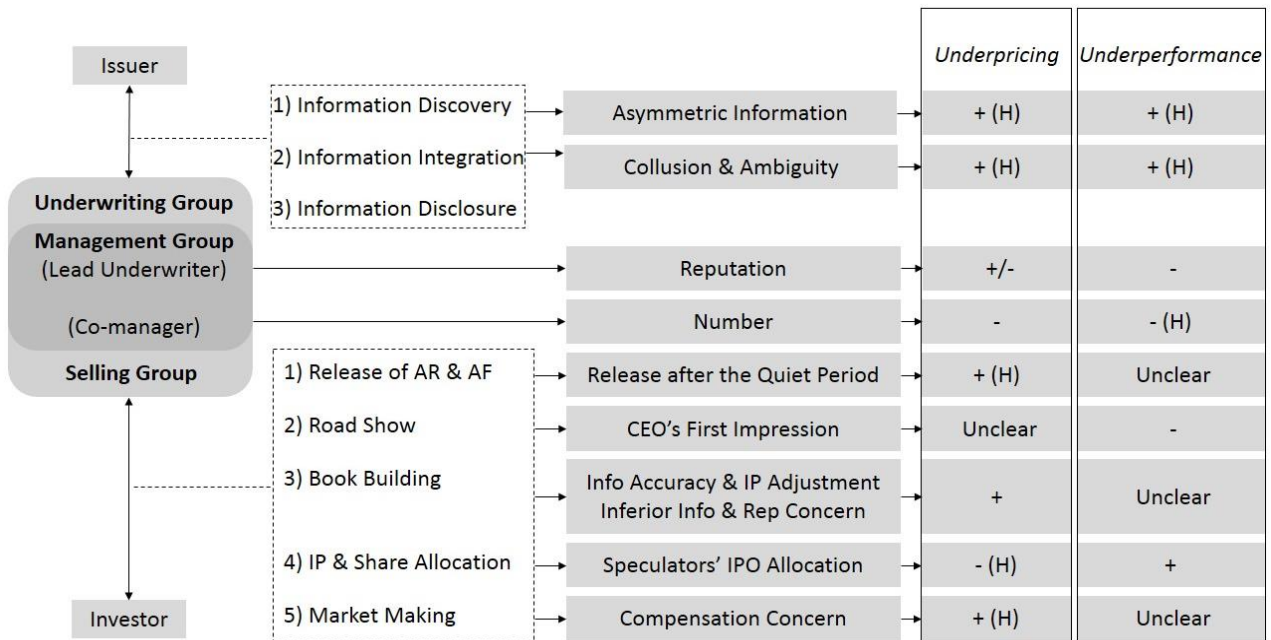


Figure 7 IPO from the underwriter's perspective. The boxes of formed by dotted lines represent the main process of interaction between 1) the issuer and the underwriting group and 2) the investors and the selling group. The column in the middle represents parameters that influence underpricing and underperformance. Positive signs in the column with underpricing and underperformance mean an increasing the level of underpricing/underperformance, and negative signs mean the opposite. (H) represents "hypothetical", and relevant hypotheses can be made for future research. "AR" and "AF" denote an analyst report and an analyst forecast, respectively; "IP" represents initial price; and "Info" represents information.

Chapter 5 Investors in IPOs

Based on the timing of their participation in the IPO process, investors can be categorized into three groups: venture capitalists, institutional investors and individual investors. As stated in Chapter 2, venture capitalists typically fund startups before the latter's IPO (Megginson & Weiss, 1991); institutional investors are the primary investors and receive allocations of initial shares before the initial date in the primary market (R. Aggarwal, 2003); and the majority of individual investors participate in the IPO process when the initial shares begin to be publicly tradable in the secondary market (Derrien, 2005; Mauer & Senbet, 1992).

Additionally, there are other ways of dividing investors. To do so, a set of concepts relating to investors needs to be introduced: institutional investors versus individual investors; large investors versus small investors; and sophisticated investors versus unsophisticated investors.

Institutional investors are considered more sophisticated information processors. 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. Similar results were found by Hirshleifer, Myers, Myers, and Teoh (2008)

by analyzing individual investors' trading behavior after a stock's earning announcement. Individual investors were found to be net buyers of stocks with either extreme positive returns or extreme negative returns. Both studies showed that individual investors are less sophisticated in terms of information processing. In the literature, they are referred to as *unsophisticated investors* or *naïve investors*, while institutional investors or large investors are referred to as *sophisticated investors* (Cohn, Lewellen, Lease, & Schlarbaum, 1975; De Bondt, 1998; Elton, Gruber, & Busse, 2004). As stated in Chapter 4, 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 trading, and thus it is unsurprising that underwriters are more willing to distribute IPOs to institutional investors than to individual investors.

Another reason that institutional investors are preferable candidates for receiving IPO shares is that they are less likely to engage in flipping or spinning activities after IPOs begin to be traded. According to the CFA Institute, underwriters are likely to ban clients that had previously engaged in flipping activities from future IPO allocation lists (CFA Institute, 2014). Additionally, in practice, another way of preventing flipping activities beyond excluding the flippers before the allocation is to impose penalty bids. The penalty bid is used to restrict the underwriting syndicate's members from distributing shares to flippers. Specifically, if the clients of a syndicate member engage

in flipping activities, the lead underwriters will deprive the syndicate member of that member's commission according to the number of shares flipped (R. Aggarwal, 2003).

Several studies have focused on ways of allocating the initial shares between institutional investors and individual investors. Both practical evidence and empirical studies in the U.S. have shown that large quantity of IPO shares are allocated to institutional investors and that individual investors are only able to receive a small proportion of IPO shares. For instance, R. Aggarwal et al. (2002) found that, in their sample of 174 IPOs, more than 70 percent of the initial shares were allocated to institutional investors. However, in other countries, studies have shown that there are cases in which underwriters are willing to allocate a relatively larger number of shares to small investors. For instance, in the Hong Kong stock market, when there is no trusting relationship between underwriters and large investors, or when underwriters cannot effectively control the occurrence of the large investors' flipping activities, underwriters are more willing to distribute the new shares, especially those of more-underpriced IPOs, to small investors who have been loyal to them (Cheng, Chan, & Mak, 2005). As mentioned by Cheng et al. (2005), this result might also be related to the protective regulations concerning small investors that are imposed in Hong Kong stock market.

Another set of contrasting concepts that should be explained is the primary market and the secondary market. As stated in Chapter 1, these two markets are distinguished by the initial date of trading. In the primary market, the initial shares are sold at the initial price before the initial date (Spindt & Stolz, 1992). The primary market is also

referred to as the initial market or the original market (R. Aggarwal, 2003; R. Aggarwal et al., 2002). In the secondary market, namely, after the initial date, the IPO shares become publicly tradable, and the share price depends on the supply and demand in the secondary market (Agarwal et al., 2008; Busaba & Chang, 2010). The aftermarket is also referred to as the secondary market (Mauer & Senbet, 1992).

As a result, in this chapter, for investors that invested in companies after the decision to go public had been made, both institutional and individual investors, will be discussed. Venture capitalists will be discussed as representatives of early-stage investors that invested in companies before the decision to go public had been made, i.e., that provide funds to support startups prior to the issuance of shares. Hence, this chapter will discuss three types of investors: venture capitalists, institutional investors and individual investors. The role of venture capital, venture capitalists or venture capital organizations, is to “raise money from individuals and intuitions for investment in early-stage business that offer high potential but high risk” (Sahlman, 1990, p. 473). Hence, venture capitalists should be categorized as organizational investors, similar to institutional investors. Consequently, this chapter will be divided into two subchapters: the first subchapter will introduce organizational investors, including venture capitalists and institutional investors, and the second subchapter will explain individual investors and their specific trading behaviors, especially the interpretation of trading behaviors from a psychological perspective.

1. Organizational Investors

1.1 Venture capitalists

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. From another perspective, 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, p. 1157). Note that the term *venture-backed firm* the companies that are funded by venture capitalists, in short, they can also be referred to as *VC-backed companies* (Ivanov & Xie, 2010; Ritter, 2014b).

A successful IPO is not only considered a factor capable of identifying a successful venture capitalist but also as a factor for measuring an outperforming VC-backed company. For instance, a study found that, on the one hand, issuing an IPO as a means of exit has been popular among VC-backed companies, especially during the internet bubble phase, and on the other hand, the success of an IPO is considered one way to measure whether a VC-backed company outperforms a non-VC-backed company (Puri & Zarutskie, 2012).

As a result, the success of issuing an IPO is important from the perspectives of both venture capitalists and VC-backed companies. Therefore, it is important to discuss details such as the function of venture capitalists, the long-term performance of VC-

backed companies, and venture capitalists' career concerns.

1.1.1 Venture capitalist and VC-backed IPOs

Several studies have found that venture capitalists have helped to increase IPO companies' value by executing different functions. These functions include providing certification and monitoring, and acting as a nexus for companies to form alliances (Barry et al., 1990; Lindsey, 2008; Megginson & Weiss, 1991).

Certificate function. Venture capitalists provide certification 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). This is supported by a study suggesting that venture capitalists' reputation was closely related to IPOs' long-term performance after the initial date (Krishnan, Ivanov, Masulis, & Singh, 2011). Specifically, this study found that the reputation of the venture capitalists had a significant, positive correlation with IPOs' long-term performance. Additionally, Krishnan et al. (2011) found that venture capitalists with better reputations tended to be more active in participating in the governance of the companies they had invested in, even after the initial date. This positive participation in firm governance could thus have a positive effect on these IPO companies' long-term performance.

Monitoring function. Venture capitalists also function as monitors of IPO companies. For instance, using a sample of VC-backed companies over a 10-year period, a study found that one of the incentives for venture capitalists to invest in IPO companies was to be in a position to exercise a monitoring function (Barry et al., 1990). Specifically, several traits of such venture capitalists were found to support their monitoring roles, such as holding concentrated equity control, maintaining their investment after the companies went public, and serving as members of the board of directors. Consequently, one of the outcomes of these venture capitalists' monitoring function was limited underpricing, according to Barry et al. (1990). Another study that supported the notion that venture capitalists serve a monitoring function was conducted by Lerner (1995). By examining the strength of venture capitalists' monitoring and the change in CEOs, Lerner (1995) found that the number of venture capitalists on the board increase in the event of a change in CEO. Specifically, he found that there were 5 times the number of venture capitalists added to the board of directors compared to the case when there was no change in CEO (Lerner, 1995). This result showed that venture capitalists strengthened their role as monitors when needed, which illustrated the importance of their monitoring function.

Nexus function. 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). Additionally, Lindsey (2008) found that alliances between companies supported by the same venture capitalist were more likely to conduct an IPO.

These three functions were found to have a significant and positive influence on the value of VC-backed IPO companies. Thus, the following lists significant differences between VC-backed IPO firms and non-VC-backed IPO firms from various perspectives (Brav & Gompers, 1997; Jain & Kini, 1995; Puri & Zarutskie, 2012).

From the perspective of performance before the initial date, VC-backed IPO companies underperformed non-VC-backed IPO companies in terms of operating performance (Jain & Kini, 1995). Jain and Kini (1995) measured operating performance using parameters including *operating return on assets* and *operating cash flow over assets*. Operating return on assets is an accounting parameter that is used to measure operating profitability per unit of an asset. Operating cash flow over assets is also an accounting parameter that measures the liquidity of cooperate profits per unit of an asset. VC-backed companies were found to have significant lower values for both parameters, meaning that they have lower profitability and asset liquidity than non-VC-backed companies. Jain and Kini (1995) interpreted this phenomenon from two perspectives. First, it is possible that VC-backed companies were prevented from engaging in *window-dressing* behaviors owing to monitor by venture capitalists. Window dressing

is the manipulation of accounting numbers around the fiscal reporting date to create a false impression improved performance through financial statements, such as delaying expenses or realizing revenues in advance (L. Allen & Saunders, 1992; Beaver, 1968). Jain and Kini (1995) argued that the reason that VC-backed companies underperformed non-VC backed companies before the initial date might be because that the latter engage in window dressing behaviors to attract a larger amount of investment during the IPO. Second, it might be the case that VC-backed companies engaged in an IPO at the earlier stage of their development than non-VC-backed companies. This interpretation was supported by data indicating that VC-backed companies had larger expenditures and smaller profit margins than non-VC-backed companies. Such characteristics (high expenditures and low profit margins) exhibit the characteristics of an early-stage developing company according to the life cycle theory of the firm (Jawahar & McLaughlin, 2001; Mueller, 1972).

From the perspective of initial shares on the initial date, VC-backed IPO shares have a higher initial price and a larger issuing size compared with non-VC-backed IPO shares, even when the sales and total assets of the two samples of IPO companies were similar (Jain & Kini, 1995; Megginson & Weiss, 1991).

From the perspective of performance after the initial date, VC-backed IPO companies outperformed non-VC-backed IPO companies in terms of operating performance. Specifically, VC-backed IPO companies had significantly larger operating return on assets and operating cash flow over assets than comparable non-VC-backed IPO companies (Jain & Kini, 1995).

From the perspective of stock market performance, a similar result supporting the notion that VC-backed IPO companies outperformed non-VC-backed IPO firms was found by Brav and Gompers (1997). In their study, the five-year equal weighted returns on IPO was used as a parameter to measure stock market performance. The returns of 934 VC-backed IPO companies and 3,407 non-VC-backed companies were compared, where the five-year average return was approximately 45 percent for VC-backed IPO stocks and approximately 23 percent for non-VC-backed IPO stocks. This study can also be interpreted from the perspective of long-term IPO underperformance, as various scholars have held that IPOs generally underperform in the long term (Espenlaub, Gregory, & Tonks, 2000; Loughran & Ritter, 1995; Ritter, 1991). However, by separating IPO companies with respect to whether they were backed by venture capitalists, Brav and Gompers (1997) observed no long-term underperformance in VC-backed IPO companies. In their study, underperformance was only observed among the smallest non-VC-backed IPO companies in their sample. After expanding the sample, underperformance was also found in non-IPO companies of a similar size and book-to-market ratio as the long-term underperforming companies in their original sample, i.e., non-VC-backed small companies. Consequently, Brav and Gompers (1997) explicitly noted that long-term underperformance should not be an IPO effect.

As a result, it seems that when analyzed from most perspectives, VC-backed IPOs outperform non-VC-backed IPOs, except for before the initial date. All of the studies mentioned above used samples from the U.S. However, interestingly, a study using a sample from Europe provided different results. According to Rindermann (2003), there

were no significant differences in performance between VC-backed IPOs and non-VC-backed IPOs in Europe. In his study, the performance measure included both operating performance and stock market performance, and the sample was collected from the stock markets in France, Germany and the U.K. Rindermann (2003) argued that this result should be interpreted as venture capitalists being heterogeneous and still experiencing a process of integration. This study, in my opinion, indirectly supports the hypothesis that VC-backed-IPO companies outperform, and thus have greater value, than non-VC-backed IPO companies.

As stated above, though venture capitalists were found to add value to IPO companies, there has been considerable discussion of whether VC-backed companies in general outperform non-VC-backed companies. Recent studies noted that VC-backed companies only outperform with respect to scale and firm growth and not with respect to profitability. From the perspective success rates, a recent study analyzing a dataset covering 25 years found that VC-backed companies generally had higher success rates than non-VC-backed companies (Puri & Zarutskie, 2012). Additionally, both successful and failed VC-backed companies outperformed non-VC-backed companies with respect to scale and not with respect to profitability. A similar result was obtained in a meta-analysis conducted by Rosenbusch, Brinckmann, and Müller (2013). Using a combination of 76 empirical samples including 36,567 companies, they found that venture capitalists had a performance effect, but this effect only appeared in firm growth and not in profitability. Additionally, the performance effect was only found to be stronger for firms at the middle phase of their development but was weaker

for firms that were very young or very mature.

1.1.2 Venture capitalists and career concerns

Career concerns have been cited as one of the important factors influencing the results of analysts and their forecasts and recommendations (Hong, Kubik, & Solomon, 2000). Similarly, it has also been identified as an important factor that influences the results of venture capitalists' decision making. Such decision making concerns IPO timing and underpricing. For instance, Gompers (1996) found that IPO companies supported by young venture capitalists tended to go public faster and had a larger amount of underpricing relative to those supported by established venture capitalists. In other words, stronger career concerns are likely to entail a lower level of underpricing. The related literature has also referred to such behavior on the part of venture capitalists as *grandstanding* (P. M. Lee & Wahal, 2004; Rosenbusch et al., 2013). The result obtained by Gompers (1996) was derived from a sample of 433 VC-backed IPO companies from January 1978 to December 1987, where younger venture capitalists were more likely to control smaller shares of the IPO companies and remain on the boards of directors of the IPO companies for shorter time. This phenomenon, in my opinion, reveals that these venture capitalists do not desire a strong psychological attachment with the firm, and thus they might have had speculative intentions before they decided to fund a firm.

A larger subsequent study of 6,413 IPO companies from 1980 to 2000, 37 percent of which was VC-backed, was conducted by P. M. Lee and Wahal (2004). They found

that VC-backed IPOs had significantly larger first-day return, i.e., a greater level of underpricing, than non-VC-backed IPOs. This difference was found to be particularly pronounced during the internet bubble period (1999 to 2000). They found that the greater underpricing tended to provide venture capitalists with higher future cash flows, and the correlation between underpricing and venture capitalists' future cash flows became stronger after 1996. In my opinion, this result shows that venture capitalists might not only be influenced by career concerns but also by the wealth effect that accompanies the issuance of IPOs.

Consequently, venture capitalists serve value-adding functions for IPO companies under most circumstances, but their decisions are also influenced by factors such as career concerns and the wealth effect. When venture capitalists have speculative intentions before investing in the companies, VC-backed IPO companies tended to go public in a shorter period of time and exhibit a larger amount of underpricing. Such speculative intentions might include creating reputation or obtaining quick payoffs.

1.2 Institutional investors

Institutional investors begin to influence the IPO process when they indicate their willingness to purchase shares during the book-building process and cease influencing the IPO process when they sell all of the shares that were distributed in the primary market or purchased in the secondary market. The approach institutional investors use to influence IPO shares is based on their abundant capital. Institutional investors receive IPO shares before the initial date; how they subsequently trade the shares (keep, sell or

repurchase) in the secondary market exerts a considerable influence on the stock price regarding both short-term underpricing and long-term underperformance. In the short term, IPO underpricing can be caused by substantial repurchasing by institutional investors in the secondary market. Specifically, if institutional investors flip immediately after the initial date, the first day return might be low due to the excessive number of shares available in the market, and thus the underpricing will be less significant. Conversely, the first-day return will be driven up if institutional investors purchase a large number of shares after the initial date. For instance, when underwriters, especially lead underwriters, have a quid pro quo arrangement with institutional investors, institutional investors have to purchase the shares and maintain the secondary market price at a high level even if the IPO is a cold issue (Degeorge, Derrien, & Womack, 2004; Griffin et al., 2007). In the long term, underperformance can result from institutional investors engaging in excessive selling activity. In other words, if institutional investors intend to decrease their level of control in the IPO and cash out, the excessive supply of shares will certainly result in declining prices and thus underperformance. The effect of selling shares can be stronger in the long term than in the short term because individual investors' purchasing of IPO shares will decrease over time (M. Baker & Wurgler, 2007; Ljungqvist, Nanda, et al., 2006). The following subchapters will introduce institutional investors and their influence on the three aspects, which are IPO allocation, IPO underpricing and IPO underperformance.

1.2.1 Institutional investors and IPO allocation

As stated in previous chapters and at the beginning of this chapter, institutional investors are usually allocated a large number of initial shares in the primary market, directly from the underwriters (R. Aggarwal, 2003; Bertoni & Giudici, 2014).

As stated in Chapter 4, 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 attempt to avoid flipping activities due to penalty bids, and thus they 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). 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).

This allocation decision is made by lead underwriters during the book-building process, as described in Chapter 4 (Cornelli & Goldreich, 2001, 2003). Lead underwriters usually ask institutional investors about their intention to dispose of the shares after the initial date, and some *quid pro quo arrangements* are likely to be reached at this stage if an IPO turns out to be a cold issue (Degeorge et al., 2004). A *quid pro quo arrangement* is an arrangement in which “underwriters require or induce clients to buy aftermarket shares” (Griffin et al., 2007, p. 519). Thus, institutional

investors are likely to be the purchaser, seller or keeper of the initial shares in the aftermarket, which consequently leads to different extents of underpricing or underperformance.

1.2.2 Institutional investors and IPO underpricing

As previously analyzed, there are several possible reasons that IPO are underpriced. Among these reasons, those related to institutional investors can be divided into three categories as follows.

First, underwriters compensate institutional investors with underpricing for the information the latter provide during the book-building process (Benveniste & Spindt, 1989). This argument has been supported by Stoughton and Zechner (1998), whose model suggested that underpricing would disappear if lead underwriters were not allowed to distribute the initial shares in favor of certain institutional investors. They also noted that in the presence of such favoritism in the distribution of initial shares, IPO companies would have higher intrinsic value due to monitoring by underwriters. This reasoning was explained in Chapter 4 and thus will not be restated here.

Second, underpricing is compensation for the risk that institutional investors take by holding extra shares because IPOs might underperform shortly after the initial date. Ljungqvist, Nanda, et al. (2006) proposed a model in which initial shares were first allocated to institutional investors, and then institutional investors gradually sold these shares to individual investors in the aftermarket after the initial date. Ljungqvist, Nanda, et al. (2006) referred to institutional investors as regular investors and individual

investors as sentiment investors. They argued that market sentiments would not be permanent. Furthermore, Mikhail et al. (2007) found that individual investors became net buyers when the return of a stock was either extremely high or low. Hence, by combining their results, it can be assumed that when individual investors' sentiments are less pronounced, the accumulated effect on individual investors would be a decrease in demand. Ljungqvist, Nanda, et al. (2006) explained underpricing as a breakeven for institutional investors because they believe that a decrease in sentiment of individual investors will decrease prices. However, in my opinion, this is more akin to compensation for risk, as a decline in demand can decrease the rate of price increases, but it is not necessarily strong enough to create a decline in a stock price. In my opinion, if the entire stock market is observed from the macroscopic level, where institutional investors and individual investors are treated as the only two parties in the market, but jointly, a decline in demand by one party means there will be extra supply for the other party. In the case of institutional investors, this means that they have to take on the risk of holding extra shares in the market that are likely to suffer a price decline in the future. Hence, to help institutional investors to break even, or more likely, to compensate for their inventory risk, the initial price should be lower, i.e., the IPO shares should be underpriced.

Third, underwriters use underpricing to favor their clients, i.e., institutional investors. R. Aggarwal et al. (2002) provided empirical support for this by reporting that the first-day return of IPOs was positively correlated with the proportion of institutional allocation, i.e., the larger the amount of underpricing there was, the greater

the number of shares allocated to institutional investors. The authors also explicitly noted that part of the underpricing was correlated with book building, as stated in the first reason for underpricing above, but book building was not necessarily the only explanation for underpricing. Specifically, underwriters were found to allocate more IPO shares with strong first-day performance and fewer IPO shares with weak first-day performance to institutional investors relative to individual investors. This effect, as suggested by R. Aggarwal et al. (2002), can be interpreted as: 1) either institutional investors acquired private information concerning the value of IPOs, which was likely to occur during the book building or even one-on-one meetings, or 2) underwriters intentionally distributed IPOs with high underpricing to favor their institutional clients. Both of these interpretations can be interpreted as underwriters intentionally favoring their institutional clients by providing them with favorable information or directly providing them with hot IPO shares.

To conclude, the reasons for underpricing connected with institutional investors can primarily be summarized into the above three categories. Following these three reasons, institutional investors are not the direct creators of underpricing, but they are the influential parties in the primary market that have the strongest bargaining power with underwriters according to various perspectives. They are capable of influencing or pressuring underwriters through underpricing because they are the underwriters' more stable clients, purchase the majority of shares, and most important, have strong purchasing power, which can change the trend in price development in the stock market. All of these characteristics make them, on the one hand, superior to individual investors

and, on the other hand, influence the pricing decisions of underwriters. Thus, in my opinion, underwriters cause underpricing in the primary market, but the more radical reason for such behavior by underwriters is to benefit the interests of institutional investors.

1.2.3 Institutional investors and IPO underperformance

The previously mentioned model developed by Ljungqvist, Nanda, et al. (2006) suggested that when the net purchasing behavior of the individual investors declines (due to the temporary nature of investors' sentiments), the market would underperform for the first 6 to 12 months after the initial date. This can be interpreted as indicating that the decreased individual purchasing behavior was one of the main reasons for the long-term underperformance. To my understanding, this model suggests: 1) in the short term, individual investors' sentimental purchasing behavior amplifies the real demand for IPOs, and thus the price of IPOs in the secondary market might be correspondingly higher than its true value; 2) in the long term, the sentimental purchasing behavior declines, and thus the price of IPOs will be influenced accordingly, and the underperformance will be the result.

However, as stated previously, in my opinion, a mere decrease in net purchasing behavior might not necessarily be strong enough to create such universal underperformance as suggested by the long-term effect. In other words, a decrease in otherwise increasing demand might only slow price increases but will not create a significant price decline. Hence, underperformance should be a combined effect of

decreased demand and increased supply. According to R. Aggarwal (2003), most of the IPO shares, approximately 73 percent, in their sample were initially allocated to institutional investors. This finding, together with the assumption that individual investors are mostly net purchasers (Ljungqvist, Nanda, et al., 2006), it is possible to assume that an increase in supply might be primarily the result of institutional investors' selling behavior in the long term. In my opinion, it can thus be assumed that institutional investors' selling behavior is the main and most significant reason for long-term IPO underperformance. This assumption can be supported from the following two perspectives.

First, institutional investors' selling activities might increase the supply of the IPO shares, thus creating underperformance. Indirect empirical support for this assumption is that, in both the short and long term, IPO companies with a large amount of institutional investment were found to outperform comparable IPO companies with a small amount of institutional investment (Field & Lowry, 2009). In other words, when institutional investors retain a large proportion of shares in IPO companies, the IPO companies ought to outperform and not underperform. Specifically, using a sample of 5,907 IPOs covering 21 years, Field and Lowry (2009) found that the IPO companies with the largest amount of institutional investment have significantly higher returns than do those with the smallest amounts, on a quarterly basis. In my opinion, institutional investors' having a large stake in a company can be interpreted as either a result of outperformance or as a reason for it. Specifically, when it is interpreted as a result, as explained by Field and Lowry (2009), this means that some IPO companies

outperform others and that institutional investors are better at identifying these companies than are individual investors. However, when it is interpreted as a reason, as in the assumption stated in the beginning of this paragraph, institutional investors' selling activities might cause the underperformance of certain IPO companies. One logical way to differentiate such factors that might be reciprocal is to detect the potential reasons of one of the factors. For instance, a study could be conducted by focusing on the reasons for institutional investors' selling activities. As there might be numerous reasons that are difficult to observe in the market, such as the decision making of institutional investors due to the influence of private information, conducting a survey on institutional investors' IPO selling behavior is a promising approach. Because it is possible that few institutional investors would be willing to supply such information, it remains unclear whether institutional investors have caused underperformance or vice versa.

Second, some individual investors' selling activities might be derived from the selling activities of institutional investors, which also increases the supply of IPO shares and thus creates underperformance. As stated by Field and Lowry (2009), institutional investors were perceived as better information processors and hence were better able to identify the quality of IPO companies than were individual investors. Based on this, institutional investors' holding activities can be interpreted as a positive signal concerning the quality of IPO companies, whereas, conversely, selling activities can be interpreted as a negative signal. A small proportion of individual investors who have superior information relative to their peers might act upon such signals. Thus this

proportion of individual investors is likely to follow the selling activities of institutions, and accordingly increase the supply of IPO shares. If one considers the concept of an information cascade, whereby peer investors follow the first movers who sell the IPO shares, the supply of IPOs will further increase (Amihud et al., 2003). Because this assumption is based on the belief that individual investors are net purchasers, and because the primary market might not be ideal enough to create an information cascade, I assume that only a proportion of individual investors would sell. Consequently, further price declines follow the creation of additional supply, and then the underperformance occurs.

In my opinion, increased supply is more likely to be the main reason for underperformance instead of decreased demand in the secondary market, which is mostly caused by institutional investors. In addition to the abovementioned two reasons, two additional conditions that need to be noted are 1) institutional investors control a large proportion of IPO shares before the secondary market becomes active, and 2) the underwriters discourage institutional investors from engaging in flipping activities shortly after the initial date (CFA Institute, 2014). Thus when they have no intention to control the shares of a given IPO company for long time, the proper time for institutional investors to sell might be after the IPO price stabilizes, i.e., in the relatively long term. There have been no recent studies focusing on institutional investors' selling behavior in the relatively long term or before IPOs begin to underperform. Thus this hypothesis can be tested by focusing on the correlation between institutional investors' selling behavior and the return on IPOs.

If one wished to summarize the impact of institutional investors on the entire IPO process, then, in my opinion, this summary should be “money talks”. They have large purchasing power, and are thus considered the most important clients of underwriters, who are willing to allocate hot initial shares to them, maintain the long-term relationship with them and even provide them with private information. They have large capital, and thus when they sell their shares, a price decline is likely. They are also able to provide generous compensation to their professional employees, and thus they are better at processing public information and considered sophisticated investors. In very long term, it is possible that the trend will be that individual investors will be no longer active in the stock market because they might be better off becoming clients of institutional investors, i.e., investing in institutions such as pension funds, hedge funds or institutional investment advisors. However, individual investors remain extremely active, which in my opinion, might be related to the current method of distributing IPO shares and to the asymmetric information between individual investors and institutional investors, both of which will require market efficiency. Besides the inefficient market, which is considered one major challenge to the traditional finance, the other major challenge, irrational investors, will be discussed in the following subchapter. Specifically, irrational trading behaviors caused by cognitive biases such as overconfidence or familiarity bias; affective factors such as pride and regret; and social factors such as media influence and interpersonal communication will be all further analyzed, together with the IPO phenomena of underpricing and underperformance.

2. Individual Investors

Some, or even the majority, of individual investors have been described as *irrational investors* (Verma & Soydemir, 2009), *naïve investors* (Hirshleifer et al., 2008) or *unsophisticated investors* (Mahani & Poteshman, 2008); according to the efficient market hypothesis, these individuals should not be participating in a perfect stock market (Basu, 1977; Fama, 1970). In other words, in an efficient market, all investors should be perfectly rational. From the perspective of economists, for instance as stated by Hirshleifer (2001), even if irrational investors exist in the stock market, the results of their irrational trading behaviors should balance out because different individuals tend to make different and independent mistakes.

However, psychologists, especially evolutionary psychologists have argued that human beings share common cognitive biases, which have been accumulated over human evolutionary history (K. P. Lim & Brooks, 2011; Lo, 2004). Hence, traders' irrational trading behavior ought to be similar and hence cannot be balanced out, such as overconfidence (Gervais & Odean, 2001), herd behavior (Bikhchandani & Sharma, 2000), the disposition effect (Kaustia, 2004), and so forth (Daniel et al., 1998a; Hirshleifer, 2001). For instance, using information from the German stock exchange (Deutsche Boerse), Dorn (2009) showed that individual investors tended to trade a similar way. In general, individual investors overpaid for IPOs in the primary market. In this study, the special trading rules in the German stock exchange provide the possibility to analyze individual investors' transactions in the primary market, beginning with book building. This is considered a novel perspective, as in most stock

markets worldwide, individual investors are only allocated with small proportion of the initial shares. This is reflected, for example, in the descriptive statistics, where individual investors were allocated from 10 to 20 percent, or slightly more than 20 percent, from the studies of R. Aggarwal (2003), and R. Aggarwal et al. (2002), respectively. According to Dorn (2009), his method was possible because since 1 August, 1999, both individual and institutional investors could purchase IPOs in the primary market at the initial price in the German stock exchange. The primary-market purchasing begins on the same day as the book building process, continues until the shares are tradable in the secondary market, and usually lasts for one week. Specifically, individual investors were found to be consistently overpaying for IPOs in the primary market (from the beginning of book building until trading began on the secondary market) and not in the secondary market, with a difference of 13 percent between the medians of the samples. Dorn (2009) suggested that this consistent overpaying was due to individual investors' irrational trading behavior in the primary market. In my opinion, when initial share allocations are not restricted to institutional investors, as in Dorn (2009), individual investors in the primary market could be representative of general individual investors in the overall stock market. Hence, it can be assumed that individual investors in general exhibit other biased trading behaviors beyond overpaying for IPOs.

Indeed, there are several psychological factors that influence individual investors' trading activities. K. Baker and Nofsinger (2002) summarized the reasons for investors' common trading mistakes into cognitive factors (how investors think), affective factors

(how investors feel) and the influence of social factors. Similarly, Hirshleifer (2001) categorized the irrational factors that influence asset pricing into four categories: 1) heuristic simplification, 2) self-deception, 3) emotions and self-control, and 4) social interactions. In my opinion, these four categories can be classified with respect to the three types of factors that K. Baker and Nofsinger (2002) proposed, which are 1) cognitive factors (heuristic simplification, self-deception and self-control), 2) affective factors (emotions), and 3) social factors (social interactions). According to K. Baker and Nofsinger (2002), cognitive factors are related to how people think. For instance, overconfidence, as discussed in Chapter 3, is a typical cognitive factor that influences people's decisions (K. Baker & Nofsinger, 2002; Hoelzl & Rustichini, 2005; Klayman et al., 1999). Affective factors are related to people's emotions, such as greed, fear, hope, pride and regret. For example, those authors explained one of the common phenomena in investment, the disposition effect, with affective factors such as pride and regret. The disposition effect describes a phenomenon whereby people tend to sell winning stocks too early and hold losing stocks for too long (Weber & Camerer, 1998). Social factors are those related to surrounding of human beings, such as herding behavior (Bikhchandani & Sharma, 2000; Shiller, 1995).

Consequently, in the following part, the three abovementioned factors will be introduced according to the sequential stages of individual investors' IPO purchasing process. These stages include 1) the stage of paying attention to and being interested in IPOs, 2) the stage of investing in or purchasing IPOs in the short term after the initial date, and 3) the stage of trading IPOs in the long term after the initial date. Because the

psychological factors mentioned above have different degrees of influence on the three stages, they will each be addressed separately.

2.1 Individual investors and initial investment in IPOs

The psychological factors that influence individual investors' decision making can be traced back to the stage at which individual investors begin to be interested in IPOs. In my opinion, at this stage, cognitive factors and affective factors both have a significant influence on investor behavior. For instance, in the general stock market, the investing behaviors of major individual investors are related to overconfidence; in the IPO market, hot and cold IPO markets are related to the overall mood of the investors during a certain period of time; and the interest in one particular IPO stock can be related to investors' familiarity with the IPO company. Hence, this subchapter will describe the influence of cognitive and affective factors at a larger scale, stock market participation, and a smaller scale, investor interest in specific IPOs. In most cases, these steps are necessary for an individual investor who is willing to purchase IPO shares, and hence it is logical to present them according to the sequence of stock market participation, IPO market participation, and specific IPO purchasing behavior. Social factors will be introduced in Subchapter 2.2 because I consider them to be stronger factors affecting investors' final purchasing decisions.

2.1.1 Influence of cognitive factors

Overconfidence

Overconfidence was discussed previously in Chapter 3 when comparing the performance of overconfident CEOs and their less confident peer CEOs. In general, overconfidence is a trait that has been found not only among CEOs but also among average individuals (De Bondt & Thaler, 1994). Regarding investors, overconfidence, in my opinion, has a direct influence on their participation in the stock market.

The extant literature on overconfidence holds that overconfidence tends to appear in two forms: the better-than-average effect and miscalibration. Specifically, the better-than-average effect describes the scenario in which people overestimate their own ability in comparison to that of others; miscalibration describes the scenario in which people overestimate the reliability of their own knowledge (De Bondt & Thaler, 1994; Glaser, Langer, & Weber, 2010; Hoelzl & Rustichini, 2005). In my opinion, both of these forms of overconfidence could be positively correlated with the likelihood that investors will participate in the stock market. For instance, when the better-than-average effect is considered as a type of overconfidence, it can be assumed that individual investors will overestimate their ability to obtain profits in the stock market; when overconfidence is considered in the form of miscalibration, it can be assumed that individual investors will overestimate the reliability of their own knowledge relating to the stock market, which might be obtained from their peers' outcomes in the stock market or from their own deductions based on public information such as that presented

by the media.

The psychological factors related to overconfidence, according to K. Baker and Nofsinger (2002), are *illusion of control* and *illusion of knowledge*. The former can lead to the better-than-average effect, and the latter can lead to miscalibration. The extant literature on overconfidence and stock market investors focuses on investors' trading behaviors in the stock market, instead of the correlation between overconfidence and stock market participation. The reason that I believe that it is important to study this correlation is that the number of newly opened trading accounts has been found to be positively correlated with the stock market index. For instance, data from the Finnish stock market from 1995 to 2002 showed that the cumulative market return peaked at 5000 points in 2000, in comparison to less than 1000 points in 1995 and less than 1000 points in 2002. Comparably, investors' entry rate also peaked in 2000 and was five times larger than the average figure from 1995 to 2002 (Kaustia & Knüpfer, 2012).

Hence, it is reasonable to assume that when overconfidence encourages participation by irrational investors, the underpricing phenomenon in the secondary market can be partly attributed to overconfidence. This assumption is based on the following: 1) irrational investors are the main purchasers of the IPO shares in the secondary market, and 2) the stock market index of IPOs is likely to be driven up by a high participation rate. In other words, it can be assumed that overconfidence on the part of individual investors in the secondary market aggravates IPO underpricing if overconfidence encourages stock market participation. Hence, in the following part, whether overconfidence encourages individual investors to participate in the stock

market, particularly regarding IPO purchasing, will be the focus of discussion.

Relatedly, Kumar (2009) conducted a study on the similarities between lottery players and lottery-like stock investors. Based on this study, future research could be conducted on the similarities between lottery players and IPO investors. Because lotteries and IPOs are comparable, based on the results of Kumar (2009), it should be possible to identify common features between lottery players and lottery-like stock investors.

The salient features of lotteries, as Kumar (2009) stated, included high risk, an extremely small likelihood of reward, low price, and small negative expected returns. In my opinion, most of these features can also be found in IPO shares. For instance, on the one hand, there might be high risk in the form of operating risk, which reflects the unpredictability of IPO companies' future operating performance (Jain & Kini, 1994); on the other hand, there might be high risk in the form of performance risk, which reflects the high probability that IPO stocks will underperform in the long term (Brav & Gompers, 1997; Espenlaub et al., 2000). IPOs could be considered to have a low probability of reward because of the low likelihood that individual investors will be allocated IPO shares in the primary market (R. Aggarwal, 2003). In special cases, IPO shares possess further common features with lotteries. For example, some IPO shares are issued at an extremely low initial price, for instance, \$5 or even lower per share in the U.S., which are also known as *penny stock IPOs* (Bradley, Cooney Jr, Dolvin, & Jordan, 2006; Fernando, Krishnamurthy, & Spindt, 2004). Another similarity is that, in some countries' stock markets (e.g., China), the distribution of the initial IPO

shares follows a *lottery scheme*, whereby a random number is created for every 1,000 subscriptions, and only those investors who have the chosen numbers will be allocated the initial shares at the end of the subscription (Coakley, Instefjord, & Shen, 2007). Hence, to some extent, it might be reasonable to regard IPO shares as lottery-like stocks, especially for the penny stock IPOs or IPOs using the lottery allocation mechanism.

Kumar (2009) noted that individual investors who invest in the lottery-like stocks shared strong behavioral similarities with lottery players, at both the macro level and micro level. At the macro level, the results showed that, in general, individual investors preferred stocks with lottery-like features, especially during economic downturns. At the micro level, lottery-like stocks were found to be invested in more frequently by 1) investors who earned relatively lower salaries than their neighbors and 2) investors from countries with a higher unemployment rate (Kumar, 2009).

Consequently, in my opinion, it is reasonable to assume that a certain number of individual investors in the IPO market also share strong behavioral similarities with lottery players. Lottery players have been found to exhibit several cognitive biases, such as the gambler's fallacy, near misses, the rollover effect, the illusion of control, and so forth (Rogers, 1998). One of these cognitive biases is *unrealistic optimism*, in other words, overconfidence (Rogers, 1998; Weinstein, 1980). Hence, it can be assumed that individual investors exhibit different levels of overconfidence in the IPO market. Because, in essence, overconfidence bias makes it more difficult for both investors and lottery players to estimate the likelihood of a future event (Glaser et al., 2010; Rogers, 1998), it is important to differentiate investors (lottery players) that exhibit a higher

level of overconfidence relative to others. Based on extant studies, in general, two factors are directly correlated with the level of overconfidence among investors (lottery players).

First, experience was found to be positively correlated with overconfidence, in both the stock market and gambling. In the stock market, Glaser et al. (2010) found that professional bankers had a higher level of overconfidence than laymen. In their study, the sample comprised 123 bankers from a large German bank and a control group of advanced students majoring in banking and finance at the University of Mannheim. The results showed that professionals had significantly more overconfidence and stronger biases in their judgments. Similarly, in gambling, Rogers and Webley (1998) found regular lottery players to be more optimistic about winning a jackpot than occasional players and non-lottery players (as cited in Rogers, 1998). This is similar to the case of CEO overconfidence, as stated in Chapter 3, where more experienced CEOs tend to be more overconfident, as overconfidence can be accumulated over time (Billett & Qian, 2008).

Second, education was found to be positively correlated with overconfidence. One study that surveyed approximately 2,000 participants showed that higher education had significant positive correlations with overconfidence (Bhandari & Deaves, 2006). “Those with formal education do not know more about investments, but they think they do: thus they are overconfident” (Bhandari & Deaves, 2006, p. 10); in my opinion, this is the most vivid description of the group of irrational individual investors. One recent survey on the general educational background of Chinese stock market investors

published by Bloomberg attracted considerable attention. In this survey, Orlik (2015) noted that among the new investors in the Chinese stock market at the end of 2014, approximately 80 percent had a high school education or below. The mainstream media, for instance Bloomberg, argued that these investors were primarily responsible for the surge in the Shanghai Stock Exchange Composite Index from 2,300 points in September 2014, to 3,300 points in March 2015. However, as Bhandari and Deaves (2006) noted regarding overconfidence bias, it is more difficult for investors with higher formal education to predict future events. Hence, it is insufficient to argue that the surge in the market index is attributable to investors with low formal education.

Therefore, combining the two abovementioned subgroups gives rise to the following question: if investors with higher formal education tend to be more overconfident, and advanced finance students tend to be less overconfident, what is the correlation between an investor's level of finance or investment knowledge and the investors' level of overconfidence?

This correlation has been studied by Bhandari and Deaves (2006), who obtained no significant result regarding the correlation between investment knowledge and overconfidence. However, their method of measuring investment knowledge is, in my opinion, questionable: two multiple-choice questions relating to the Canadian asset market were asked, one asked for "the average return on the Canadian stock market between 1982 and 2001", the other asked for "the average long-term Government of Canada bond yield during the same period" (Bhandari & Deaves, 2006, p. 11). The reasons that I believe that those authors' method is questionable are as follows: 1) the

number of questions they asked could be insufficient to obtain an overview of participants' investment knowledge; 2) the experience was not included as a control variable. They mentioned that the age distribution of their sample was close to that of the general Canadian labor force, and hence experience should be controlled for in their sample because it is correlated with the level of overconfidence, according to Glaser et al. (2010). In my opinion, because the source of overconfidence lies in the false understanding of the probability of a future event (Rogers, 1998; Weinstein, 1980), it is reasonable to assume that when experience is controlled for, individuals who have more financial knowledge tend to be less overconfident.

As a result, at the micro level, there are eight groups of individual investors who exhibit different levels of overconfidence and thus have different investment performance. These eight groups are divided according to the high and low levels of the three factors abovementioned factors: 1) experience, 2) investment knowledge, and 3) formal education (Table 3). For instance, professional bankers would be classified in the group of investors who have a high level of experience, high level of formal education and high level of investment knowledge; investors exhibiting a gambling attitude toward the stock market would be placed in the group of investors who have low levels of all three factors.

Table 3

Groups	Formal education	Investment knowledge	Experience	Example
1	High	High	High	Professional bankers
2	High	High	Low	Advanced finance students
3	High	Low	High	Experienced stock market gambler (with high education)
4	High	Low	Low	Advanced non-finance students
5	Low	High	High	Experienced stock market investors (with low education)
6	Low	High	Low	Finance news lovers (with low education and low experience)
7	Low	Low	High	Experienced stock market gambler (with low education)
8	Low	Low	Low	Newly entered stock market gamblers (with low education)

It would be meaningful for future studies to compare the levels of overconfidence level exhibited by these eight groups and to study the combined results of the three factors. Another way to study these three factors is to estimate a regression with 1) the level of experience, 2) the level of investment knowledge, and 3) the level of formal education as independent variables and the level of overconfidence as the dependent variable. Such studies could offer important insights from both the economic and regulatory perspectives. In practice, people tend to have the plausible impression that more educated and experienced investors tend to perform better in the stock market; however, it is highly likely that empirical results would contradict this impression. For instance, when more experience leads to stronger overconfidence bias, which in turn results a lower investment return, as Glaser et al. (2010) noted, from a regulatory perspective, policies that encourage the fresh finance graduates to be involved in

significant investment decisions should be adopted.

To conclude, for future studies seeking to analyze the relationship between overconfidence and IPOs, three hypotheses can be formulated based on the theories and empirical results mentioned above: first, individual investors' overconfidence is positively correlated with their likelihood of IPO subscription; second, individual investors' overconfidence is positively correlated with their likelihood of penny stock IPO subscription; and third, individual investors' overconfidence is positively correlated with their likelihood of IPO subscription where a lottery scheme is used. Among all of the potential variables, formal education, income, gender, experience, and investment knowledge should be included as controls because they are correlated with the level of overconfidence (Barber & Odean, 2001; Bhandari & Deaves, 2006; Glaser et al., 2010; Kumar, 2009; Lundeberg, Fox, & Punócohaí, 1994). The three hypotheses mentioned above were developed based on the correlation between individuals' overconfidence and their likelihood of purchasing a lottery as a reference, as Rogers and Webley (1998) showed that frequent lottery players tended to be more overconfident in their belief of winning a jackpot. Hence, when there is a positive correlation between overconfidence and the likelihood of IPO subscription, one can conclude that the overconfidence of individual investors contributes to IPO underpricing. The specific contribution of individual investors' overconfidence is to drive the secondary market price higher than it would be in the absence of overconfident investors. According to economists, the level of IPO underpricing is usually measured by the price difference between the initial price and the first-day closing price in the

secondary market, for instance, the first-day return (Asquith et al., 1998; Hanley, 1993; Rock, 1986; Zheng & Li, 2008). Additionally, as stated in Chapter 3 and Chapter 4, underpricing can be categorized into two parts. The first is necessary underpricing (or unavoidable underpricing). This part of underpricing is created by the information asymmetry between issuers and investors. The second is intentional underpricing. This part of underpricing is created by underwriters for various purposes (as stated in Chapter 4), due to the information asymmetry between underwriters and issuers (R. Aggarwal, 2000; Sherman & Titman, 2002). Hence, although the first-day return has been considered the major factor driving underpricing, existing studies have solely focused on underpricing that occurs in the primary market. However, the price difference generated in the secondary market on the first day after the initial date has often been neglected. As stated in this subchapter, individual investors' overconfidence is also highly likely to contribute to the first-day return. A potential reason that economists have neglected this factor is that they assume that investors are completely rational, and hence cognitive biases such as overconfidence would be ignored.

As such, in my opinion, underpricing in the secondary market is should be termed *overpricing*, as this part of the price difference is driven up by individual investors' irrationality relative the case in which they are rational. In other words, I believe the total difference between the initial price and the closing price on the first trading day can be separated into two parts. The first part is created in the primary market, where both issuers and underwriters set the price lower during the book-building process, and thus can be called underpricing. The second part is created in the secondary market,

where the individual investors drive the market price up due to their irrationality, for example, in the form of overconfidence, and thus should be termed overpricing. Although several scholars have noted that IPOs are overpriced (such as Derrien, 2005; P. D. Drake & Vetsuypens, 1993), they used the term to simply mean the opposite of underpriced, instead of studying the reasons for overpricing from all three perspectives (issuer, underwriter and investors) and in both markets (the primary and secondary market). By conducting an analysis from the three perspectives and two markets, one can examine the reasons for the price difference between the initial price and the first-day closing price in a thorough and complete way. This argument is new in explaining the IPO underpricing phenomenon because previous studies have tended to isolate the primary market and secondary market when analyzing underpricing; in other instances, the perspectives of the three parties were considered interchangeably without emphasizing the different underlying mechanisms. This argument is based on the fact that the IPO prices (both the initial price and the market price) cannot simply be decided by one party or in one market. Thus IPO underpricing is a result of the combined effects of all three parties and two markets, where all contribute to the price difference in various ways. Hopefully, this argument can provide new insight for underpricing studies and improve understandings of the IPO underpricing phenomenon.

Familiarity bias

Familiarity bias is a cognitive bias that makes people favor things that they are familiar with more than those they are not (K. Baker & Nofsinger, 2002). Several

studies have found that the familiarity of certain stocks influences individuals' decisions while betting, trading stocks or constructing their portfolios (Chew, Ebstein, & Zhong, 2012; Grinblatt & Keloharju, 2001a; Huberman, 2001; Massa & Simonov, 2006).

For instance, a study using a sample of Finnish investors showed that they tended to trade more stocks from companies that were closer to them on a geographical, linguistic and cultural dimension (Grinblatt & Keloharju, 2001a). Specifically, these three dimensions were referred to as 1) the distance between the company and the investors, 2) whether the language used by the company was the same as that of the investors, and 3) whether the CEO was from the same cultural background as the investors. The abovementioned trading behaviors include buying, holding and selling behaviors. In other words, such familiar stocks essentially attract more attention from investors and are more successful at attracting investors' funds. This study can be used as a good example of the influence of familiarity bias. For instance, according to Grinblatt and Keloharju (2001a), the marginal effect of distance decreased for the stocks of companies that were nationally popular. Because both the proximity and popularity of a company increase investors' familiarity with it, the effect of familiarity bias influenced by one factor (distance) can be weakened when both factors (distance and popularity) exist. Similarly, a study using data from the U.S. showed that investors tend to construct their portfolios using stocks of the firms located in the investor's home region and using the stocks of firms that produce the products that investors are accustomed to purchasing (Huberman, 2001). Furthermore, Huberman (2001)

explicitly noted that when exhibiting familiarity bias, investors tended to neglect expected-utility-based portfolio theory, which emphasizes portfolio risk diversification. In other words, this study is direct evidence that familiarity bias affects irrational investors.

One of the possible reasons for familiarity bias is the illusion of control. As previously introduced in the subchapter on overconfidence, the illusion of control describes the phenomenon whereby people overestimate the expected influence they can exert over an uncontrollable event (Harris & Osman, 2012; Langer, 1975). The reason that it is considered one of the causes of familiarity bias is that studies have found that the illusion of control was positively correlated with factors such as familiarity and personal involvement (Langer, 1975; Yarritu, Matute, & Vadillo, 2014). A set of classic studies conducted by Langer (1975) proposed that some factors relating to individuals' skills would lead to an increase in personal confidence. These skill factors included: competition, familiarity, choice and involvement. A recent study focused on one of the factors, personal involvement, and showed that the more people were involved in obtaining their objectives, the stronger was their illusion of control (Yarritu et al., 2014). Yarritu et al. (2014) proposed that the illusion of control is exacerbated by people's confusion between personal involvements and the probabilities of acting. In other words, in my opinion, this phenomenon can be interpreted as indicating that people tend to have the illusion that all the effort will pay off, and neglect the fact that some events are actually uncontrollable or that their effort is not necessarily contributing to achieving their objectives. Hence, this might be one of the reasons that

the customers of a certain company tend to invest in its stock (if the customers invest in the stock market) or, more directly, that the employees of a certain company also tend to invest in its stock (if the employees invest in the stock market).

Another argument regarding familiarity was proposed by Massa and Simonov (2006). In their study, they showed that familiarity influenced investors along two dimensions: first, the effect of familiarity outweighs investors' hedging intentions such that their portfolios tend to include more familiar stocks; second, it influenced the investors' general risk preferences. Specifically, they defined *familiar stocks* as those that 1) were geographically proximate to investors, 2) were proximate to investors with respect to industry, or 3) were invested in by investors for a certain period of time. However, they argued that "familiarity is not a behavioral bias, but is information driven" (Massa & Simonov, 2006, p. 633). This conclusion was obtained by analyzing a sample of Swedish investors. The empirical results showed that investors with more information were less affected by familiarity and their stocks performed better than would have been the case if they had hedged, i.e., if they had invested without the influence of familiarity. Hence, Massa and Simonov (2006) argued that familiarity was driven by information and should not be considered a bias.

In my opinion, it is possible that investors exhibit familiarity bias when they participate in the stock market for the first time. The more experienced they become, the more likely they are to focus on the stocks they have chosen, and the more information they will receive related to their chosen stocks. In other words, I believe that familiarity bias and the familiarity effect, which is driven by information, occur at

different stages for a stock market investor. Because there is always information overload in the stock market (Agnew & Szykman, 2005; Paredes, 2003), it can be challenging for beginners to thoroughly investigate each stock that is available in the stock market. Hence, familiarity bias plays a role at this stage, which helps investors to simplify the selection process and provides them with “an easy way out” (Agnew & Szykman, 2005, p. 57). Subsequently, as investors gain experience related to the stocks they hold, they become better informed and more experienced observers of such stocks, which can be regarded as the stage where information driven familiarity is established. The stage is similar to the saying from Mark Twain, “Put all your eggs in one basket, and watch that basket” (as cited in P. A. Samuelson, 1994).

Regardless of whether familiarity is a bias or is driven by information, one overall conclusion is that investors invest in the stocks with which they are familiar, with respect to geography, occupation and previous investment experience. Hence, for a specific IPO, it is possible that investors with related IPO investment experience are more likely to invest in another IPO. Additionally, investors are more likely to invest in a certain industry, or even a certain company, that is closely related to their job. Thus, it can be assumed that the popularity of an IPO in the stock market is ultimately a question of how much influential power it has, including domestic influence, occupational influence and product influence. For instance, from an individual investor’s perspective, a famous football club’s IPO is more likely to attract its fans to hold shares, while Twitter’s IPO would be more appealing for an active Twitter user than for a football fan. From an institutional investor’s perspective, an IPO with a more

influential roadshow or a more successful one-on-one meeting can attract more of its funds due to the effect of familiarity. Thus, the familiarity factor can be considered one of the nonfinancial reasons that some IPOs are more popular than others, in other words, why some IPOs gather substantial funding and are significantly underpriced, while other IPOs are considered cold issues and occasionally have negative first-day returns. Additionally, when individual investors exhibit familiarity bias toward a certain IPO stock, they are more likely to purchase its shares immediately after the initial date and less likely to flip the shares relative to speculative investors. As a result, familiarity bias might increase the level of underpricing in the secondary market and decrease the likelihood of underperformance in the long term for IPOs with which investors are familiar.

2.1.2 Influence of affective factors

Mood

Affective factors, as previously stated, are about how people feel. Emotions such as greed, fear, regret and pride are affective factors (K. Baker & Nofsinger, 2002). Similarly, many psychologists also consider mood to be one of the affective factors (Gotlib & McCann, 1984; Hirshleifer, 2001; Kelly & Barsade, 2001; Schwarz & Clore, 1983). Some scholars (such as K. Baker & Nofsinger, 2002) also categorized it as a cognitive factor, due to the mechanism through which it influences decision making. For instance, K. Baker and Nofsinger (2002) stated that investors in a good mood tend to be optimistic, which is “one of the precursors to overconfidence” (p. 103).

Regardless of the different categorizations, mood has been considered one of the factors that significantly influence investment decisions (K. Baker & Nofsinger, 2002; Bollen, Mao, & Zeng, 2011; Hirshleifer, 2001). Previous studies have used the weather, specifically the amount of sunshine or the season, as a general mood detector to study investors' decisions. The use of these weather-related factors as mood detectors has been supported by several empirical studies, and positive correlations have been found, for instance between the amount of sunshine and mood (Cunningham, 1979; Howarth & Hoffman, 1984; Sanders & Brizzolara, 1982; Schwarz & Clore, 1983). In an experiment by Schwarz and Clore (1983), participants were interviewed by telephone on sunny and rainy days. Significant differences were found between mood (momentary happiness) in sunny and rainy weather, and similar results were obtained for well-being (general happiness, life-satisfaction and desire to change). Specifically, on sunny days, participants were significantly happier (from both the momentary and general perspectives), had higher life-satisfaction and less desire to change than on rainy days.

Using weather as a mood detector, scholars found that investment decisions and the consequent returns in the stock market varied on days with different weather. Hirshleifer and Shumway (2003), using a sample of 26 stock exchanges from around the world, found that stock returns were negatively correlated with the amount of cloudiness. In other words, the stock returns on sunny days were found to be significantly higher than on days with unpleasant weather. Studies that have focused on weather conditions in a given region have shown similar results in selected countries,

for instance, the weather in New York City was found to have a long history of influencing major stock price indexes (S.-C. Chang, Chen, Chou, & Lin, 2008; Saunders Jr, 1993); the temperature and cloud cover in Taiwan were found to influence that country's stock returns (T. Chang, Nieh, Yang, & Yang, 2006); and some weather factors (rain and daylight savings time changes) were found to have a minor but significant influence on the Irish stock market (Dowling & Lucey, 2005). Daylight savings time changes (DTSC), which take place twice per year (except for certain Asian countries such as Japan and China). The change in time usually occurs in spring and autumn, when the clock time goes forward or backward for one hour, respectively (Dowling & Lucey, 2005). Coren (1997) found that DTSC caused anxiety due to the interruption of sleeping patterns (as cited in Dowling & Lucey, 2005). Besides the abovementioned studies, one exception was Spain, where no significant influence of weather on stock prices was found (Pardo & Valor, 2003). This exception might be explainable by a study on the subject of seasonal affective disorder (SAD). SAD is a condition that affects people due to the different hours of daylight in different seasons. Kamstra, Kramer, and Levi (2003), after controlling for other seasonal factors affecting the stock market, found a significant and substantial SAD effect in stock market returns. Interestingly, stock markets in countries located at higher latitudes showed stronger SAD effects, and a six-month synchronized lag was found in stock markets located in the Southern Hemisphere. Hence, this result indicates that the more significant differences there are between the seasons, the greater the extent to which people are influenced by the SAD effect. In my opinion, the influence of weather can be similar:

in countries where weather differs substantially, the effect of weather on the stock market ought to be significant. Thus, it is possible that, in Spain, where there is generally sufficient sunshine, the effect of weather on investors' mood is weakened. This contrasts with Pardo and Valor (2003) proposed conclusion for their study, as I believe that without excluding the possibility that Spanish investors might be insensitive to the weather, their conclusion that the Spanish stock market is efficient cannot be considered a solid argument.

Hence, most of the studies listed above have shown that investors' trading behaviors were generally influenced by mood, using weather as a proxy. With the development of computer science and social networks, it later became possible to employ other more direct mood detectors, namely, based on people's expressions of mood. For instance, what people post on Twitter has been used as a mood detector. One application of this mechanism is to detect the general mood on Twitter, an approach used by Bollen et al. (2011). They collected approximately 10 million tweets from approximately 2.7 million users covering the period from 28 February, 2008 to 19 December, 2008. Their sample excluded spam accounts and was collected by sorting for all tweets containing key words such as *I feel*, *I am feeling*, and *I'm feeling*. Two assessments of the public daily mood (mood detectors) were generated accordingly: *OpinionFinder* was used to assess positive and negative mood, and *GPOMS* was used to measure mood along six dimensions, which are calm, alert, sure, vital, kind and happy. *OpinionFinder* is a software package that can be used to identify whether a sentence is positive or negative in terms of emotional polarity. *GPOMS* is short for

Google-Profile of Mood States, which contains 964 terms computed by Google in 2006. These 964 terms were pulled from 1 trillion word tokens from public webpages (Bollen et al., 2011). By using these two mood detectors, Bollen et al. (2011) were able to predict daily ups and downs in the closing value of the Dow Jones Industrial Average (DJIA) with an accuracy of 86.7 percent. Another similar study that used tweets as a mood detector was conducted by X. Zhang, Fuehres, and Gloor (2011). They tracked tweets from a list of IP addresses for 6 months, from 30 March, 2009 to 7 September, 2009. The number of tweets posted from this sample varied from 8,100 to 43,040 per day. The authors counted all the tweets containing mood-related terms, such as *hope*, *happy*, *fear*, and *anxious*. Their result showed that mood of these selected tweets had a significant correlation with the Dow Jones, S&P 500, NASDAQ and VIX, especially mood descriptions involving the terms *hope*, *worry* and *fear*. Among these indexes, the Dow Jones and S&P 500 are calculated based on the stock prices of a certain number of representative companies and are supposed to represent U.S. stock market quotes. NASDAQ is one of the U.S stock markets and is also considered the second-largest stock exchange in the world (Rao, Davis, & Ward, 2000). VIX, however, is short for the Chicago Board Options Exchange Market Volatility Index and is used to measure stock market volatility in the short run (Whaley, 1993). Among these indexes, negative correlations were found between the extent of twitter mood and the first three indexes, and a positive correlation was found between mood and VIX with a one-day lag. For instance, when a strong mood was detected on twitter, through terms such as *hope*, *fear* and *worry*, the Dow Jones index was lower on the next day. Studies extending this

approach demonstrated that public mood detected via peoples' daily tweets were significantly correlated with various aspects of events concerning economics, politics, and culture (Bollen, Pepe, & Mao, 2009; Thelwall, Buckley, & Paltoglou, 2011). For instance, these events include the election of the U.S. President and Thanksgiving Day, and the indexes affected include the stock market index and crude oil price index (Bollen et al., 2009).

Consequently, regardless of which detector is used to detect public mood, numerous studies have demonstrated the aggregate influence of mood on stock market indexes. Because existing studies have solely focused on the stock market in general, in my opinion, a set of new studies could be conducted using well-developed social media platforms. The first study proposal addresses the correlation between individual investors' mood and a stock market index. In my opinion, the two abovementioned approaches to detecting mood covered different individual pools in their samples. For instance, when using weather, which is a cause of public mood, as a mood detector, the population represented by the sample was more likely to be the investors involved in the stock market. However, when using tweets, which are the result of the public mood, as a mood detector, the population represented by the sample was likely Twitter users. With a sufficiently large sample, Twitter users can represent the public mood; however, is it necessary to include everyone in the sample to forecast the stock market? Because public mood as indicated by tweets, including from non-investors, has already been found to have a high predictive accuracy for the DJIA (Bollen et al., 2011), what would the result be if the sample only contained stock market investors?

Hence, my first suggestion for future studies is that, when sampling from Twitter, a pre-selection procedure could be employed that identifies certain Twitter users who have previously posted terms related to the stock market prior to period of analysis. Because these are the individuals whose decisions have a direct influence on the stock market index, theoretically, by using these individuals' aggregated mood as the independent variable, the correlation should be more robust and the forecast should be more accurate than in prior studies.

The second proposal is related to public attention and the IPO market. The principle behind it is similar to the abovementioned one, which is that public attention paid to IPOs should have a significant influence on the popularity of the IPO market. Previous studies have shown that that IPO market can be categorized into a hot market and cold market, where in the former, underpricing is more robust and the number of IPO companies is significantly higher than in the latter (Derrien, 2005; Ibbotson & Jaffe, 1975; Ljungqvist, Nanda, et al., 2006). Consequently, a positive correlation might be detected between how often people tweet about IPO-related terms and the general popularity of the IPO market.

Technological developments and the accessibility of big data facilitate scholars' efforts to develop new ways of detecting peoples' mood and even provide the possibility of making short-term predictions of future stock market performance. Information has long been regarded as one of the scarce sources in asset pricing (see Detemple, 1986; L. P. Hansen & Richard, 1987), but what if modern technology makes all types of information accessible and processible? The boundary between public and

private information will be eliminated, information asymmetry might be reduced, and consequently, the market will be more efficient. An alternative outcome would be that information remains scarce and simply shifts from being in the hands of insiders to being in the hands of data processors. At present, it is difficult to predict what will happen; however, in my opinion, one main theme for future study will be related to big data and the analysis of the massive amount of information generated by the public.

2.2 Individual investors and IPO short-term underpricing

This subchapter, as stated at the beginning of Subchapter 2, will introduce the cognitive and social factors that influence individual investors' decisions to participate in the stock market and invest in IPOs after the initial date. Because the affective factors primarily played a role in the last stage, when individual investors became interested in stock market investment or, further, in IPO investment, these factors will not be further discussed in this subchapter.

2.2.1 Influence of cognitive factors

Cognitive factors were found to have significant influences on stock market participation. For instance, Grinblatt, Keloharju, and Linnainmaa (2011) showed that intelligence quotient (IQ) was positively correlated with stock market participation. By using a Finish sample of 158,044 males, significant differences in stock market participation were found between individuals who had higher IQ and lower IQ. Based on the different IQ levels, Grinblatt et al. (2011) categorized their sample into 9 groups,

from IQ=1 to IQ=9. A decomposition analysis between groups IQ=1 and IQ=9 was made. In general, the former group had a stock market participation rate of 9.8 percent, and the latter group had a participation rate of 46.52 percent. Of the 36.72-percent difference between these two groups, 23.33 percent can be explained by other factors such as education, income, and wealth, leaving a 13.39-percent otherwise unexplainable difference that can be attributed to the influence of IQ. Similarly, a 29.45-percent participation difference was found between the IQ=2 group (13.07 percent) and IQ=8 group (42.52 percent), of which 17.88 percent can be explained by the other abovementioned factors and 11.57 percent cannot.

In the following parts, cognitive factors that exert direct influences on stock market participation will be introduced. These factors include cognitive dissonance, cognitive trust and other cognitive factors.

Cognitive dissonance

Cognitive dissonance, as applied to the investment field, was proposed by Shiller (1999). It describes the conflicts that occur in individuals' minds when new information demonstrating that their previous opinions or beliefs were wrong. One reason that cognitive dissonance is important is that, as Festinger (1962) noted, dissonance is difficult to avoid in everyday life. Another reason is that cognitive dissonance was found to influence individuals' behavior in several respects, such as consuming, commitment, and investment (K. Baker & Nofsinger, 2002; Prast & De Vor, 2005; Shiller, 1999; Thøgersen, 2004).

Festinger (1962) offered two possible explanations for the occurrence of dissonance. First, new information might emerge and challenge individuals' existing opinions, which creates a temporary cognitive dissonance. Second, even without new information, dissonance could be difficult to avoid because most matters involve combinations of conflicts. Consequently, individuals might frequently find themselves suffering from cognitive dissonance.

Indeed, studies on cognitive dissonance have been conducted in several disciplines other than investment. For instance, from the perspective of consumption, Cummings and Venkatesan (1976) reviewed consumers behaviors from two perspectives: 1) dissonance might lead to a complete change in attitudes, and 2) dissonance might cause individuals to neglect certain information that contradict their beliefs. In general, cognitive dissonance can lead consumers to engage in repurchasing behavior (Yi & La, 2004), to intentionally stop reading commercials related to brands other than the brand they have purchased (Shiller, 1999), or to post-purchase regret when consumers experience feelings that conflict with their previous opinions (Graham, Stendardi Jr, Myers, & Graham, 2002). From the perspective of commitment, Langevoort (1997) noted that people tended to think, believe and act consistently once a commitment was made. Interestingly, Graham et al. (2002) found that females in general experienced stronger cognitive dissonance than did males.

From the perspective of investment, cognitive dissonance has been studied in the contexts of mutual fund investment, foreign currency investment, and stock market investment (K. Baker & Nofsinger, 2002; Kaustia & Torstila, 2011; Prast & De Vor,

2005). In the area of mutual fund investment, Goetzmann and Peles (1997) noted that investors tended to have a positive bias when evaluating their past performance, even if they were informed that their performance was poor. The authors argued that such positive bias was caused by cognitive dissonance whereby individuals tend to alter or adjust their memories to make their memories consistent with their beliefs. Moreover, investors were found to react slowly to information regarding past poor performance, meaning that they prefer to hold a losing investment for a relatively long time. Goetzmann and Peles (1997) explained such slow reactions by the *endowment effect* and cognitive dissonance. The endowment effect describes the phenomenon whereby individuals demand greater compensation for giving up an item than the amount that they would pay for it (Thaler, 1980). This effect will be introduced in Subchapter 0 in terms of passive stock holding behaviors. Cognitive dissonance, in such a context, prevents investors from selling losing mutual funds due to the possibility that investors might have adjusted their behaviors to fit their biased beliefs concerning their mutual fund investment (Goetzmann & Peles, 1997). Similarly, cognitive dissonance was reported in the foreign currency exchange context by Prast and De Vor (2005). They noted that investors reacted differently to good and bad news, which can be explained by cognitive dissonance because investors tend to filter news reports according to their biases.

Specifically, in the case of stock market participation, investors' prejudices concerning stock market investment can be separated into two categories: positive prejudice and negative prejudice. Hence, cognitive dissonance can have either a

positive or negative effect on the likelihood of stock market participation. The positive effect can be interpreted as cognitive dissonance encouraging individuals to participate in the stock market. For instance, investors who have positive prejudices regarding the stock market or individuals who have decided to participate in the stock market and invest in a certain stock tend to neglect the negative information or bad news concerning stock market investment due to cognitive dissonance (Prast & De Vor, 2005; Ricciardi & Simon, 2000). In this context, dissonance exerts a positive influence on investors' stock market participation because it prevents them from being affected by relevant negative information. However, the negative effect of cognitive dissonance can be interpreted as discouraging individuals from participating in the stock market. For instance, Kaustia and Torstila (2011) argued that, for investors suffering from stock market aversion, cognitive dissonance should be considered an additional cost of stock market investment. The authors did explicitly explain why cognitive dissonance should be considered an additional participation cost, but in my opinion, this can be explained from the perspective of utility. According to Gilad, Kaish, and Loeb (1987), cognitive dissonance should be considered a factor that decreases individuals' utility. Furthermore, it has been argued that factors that decrease investors' utility encourage investors to seek higher returns to compensate, for example, for risk (Pratt, 1964). Hence, cognitive dissonance reduces one's return on investment, which from another perspective should be considered an additional cost. The result of an additional cost is that it increases the difficulty of stock market participation for investors who have a negative prejudice concerning stock market investment.

In my opinion, in most circumstances, for investors who have certain and clear prejudices concerning stock market investment, the function of cognitive dissonance is similar to that of a catalyst that accelerates the decision-making process and amplifies investors' prejudices concerning stock market investment. It encourages those who wish to invest and discourages those with stock market aversion (Kaustia & Torstila, 2011) or, further, IPO aversion. The influence of dissonance on IPO underpricing and underperformance can be positive or negative because, as stated above, cognitive dissonance functions as a catalyst: it either accelerates the IPO investment decision-making process and amplifies the amount of an IPO purchase, or it discourages individuals from engaging in IPO investment and encourages those who hold IPO shares to sell. Investors with negative opinions on IPO investment engage in behaviors that conflict with their original opinions, but they will have to shift their original opinions to reduce the cognitive dissonance, as Ricciardi and Simon (2000) have suggested.

Cognitive trust

There are two types of trust, according to D. Johnson and Grayson (2005), cognitive trust and affective trust. Cognitive trust can be defined as the confidence to depend on the other party's reliability, which is based on knowledge of the other party and is considered a rational approach (M. H. Hansen, Morrow, & Batista, 2002; Johnson-George & Swap, 1982; Rempel, Holmes, & Zanna, 1985). However, affective trust can be defined as one's confidence in the other party based on the feelings and

emotions such as security (Erdem & Ozen, 2003; Johnson-George & Swap, 1982; Swift & Hwang, 2013). The reasons that these two concepts are differentiated here are, first, that it is imprecise to categorize trust simply as a cognitive factor or a social factor; second, existing studies on trust and stock market participation have not explicitly noted which type of trust influences individual investors' decisions concerning stock market participation.

Generally, studies have found that trust exerts a significant influence on stock market participation. For instance, Guiso, Sapienza, and Zingales (2008) found that investors who were less trusting were less likely to participate in the stock market, and if they did, they purchased fewer stocks. In their study, trust was defined as “the subjective probability individuals attribute to the possibility of being cheated” (Guiso et al., 2008, p. 2557). Trust was also measured by a question regarding whether participants believed that people could be trusted. Their sample comprised 1,943 Dutch households. Their results showed that, for those who trust others, were 6.5 percentage points more likely to participate in the stock market, which 50 percent higher than the average sample probability of stock market participation. Another study on trust and stock market participation was conducted by Georgarakos and Pasini (2011), where sociality was also considered as an independent variable in addition to trust. Sociality, which will be discussed in Subchapter 0, was found to have a positive influence on stock market participation (Hong, Kubik, & Stein, 2004). When sociality and trust were examined jointly, the combined effect showed that sociality could partially offset the negative effect of low trust on stock market participation. Hong et al. (2004) measured

trust by historical changes in political institutions, and sociality was measured by the frequency of contacts with grandchildren, at the macro level. Interestingly, the influence of trust was found to be stronger in countries with both a low level of stock market participation and a low level of trust. Georgarakos and Pasini (2011) argued that this explained the phenomenon of low stock market participation in wealthy countries. Hence, it can be assumed that when individual investors have higher cognitive trust in the IPO market, they are more willing to invest in IPO shares, especially when IPO begin to be publicly purchasable in the secondary market after the initial date. This can increase the demand of IPO shares in the secondary market and hence create a larger amount of underpricing in the short term. In the long term, investors having cognitive trust in certain stocks might attenuate the level of underperformance of these stocks. This is because stronger trust might lead to investors having a positive expectation regarding a stock's future performance, and hence they tend to hold the stocks for a relatively longer period.

I would like to extend these conclusions to propose a further hypothesis regarding the Chinese stock market, as the stated in Subchapter 0, where approximately 80 percent of participants in the stock market had a high school education or below, as of the end of 2014 (Orlik, 2015). However, Van Rooij, Lusardi, and Alessie (2011) found that financial literacy was positively correlated with stock market participation. In other words, people who know little about financial matters were less likely to invest in the stock market. If one assumes that people with a lower level of education are less likely to have high financial literacy, as they might have lower literacy in general, then it

would be difficult to explain Chinese stock market participation based on the results obtained by Van Rooij et al. (2011). Hence, what would be found if all the three factors, financial literacy, sociality and trust were considered? As Chinese society has a highly collective culture (Fan, 2000), sociality could be very high if measured using the approach of Georgarakos and Pasini (2011) that considers the frequency of contacts with grandchildren. Trust, however, might vary across different regions in China, due to the significant different levels of urbanization in various regions. For instance, political trust was found to be differ between village and city residents (L. Li, 2004). Hence, one could hypothesize that in countries with a higher level of sociality, the effects of financial literacy on stock market participation will be lower. Such effects will stronger in regions with a higher level of trust than in those with a lower level of trust.

Another proposal for future research is to separately test the effects of cognitive and affective trust. It is likely that more specific results will be found, and based on these results, policy suggestions can be offered regarding stock market participation. For instance, in countries where the government interferes with the stock market, such as China, if investors are to be encouraged to participate in the stock market, policies that encourage trust should be promoted. If the results of such studies were to suggest that cognitive trust has an influence on stock market participation, investors should be provided with further knowledge about the stock market to increase cognitive trust. However, if affective trust were found to influence stock market participation, policies such as increasing investors' feelings of security with respect to the stock market should

be considered.

Other cognitive factors

According to the literature, there are other cognitive factors that influence individuals' investment decisions. For instance, K. Baker and Nofsinger (2002) noted that the representativeness heuristic affected individuals' short-term investment behavior; Hirshleifer (2001) stated that individuals tend to *sharpen and level* while processing information.

Specifically, the representative heuristic describes an approach to thinking whereby individuals estimate the probability of an event based on its resemblance to another event (Tversky & Kahneman, 1974). The direct effects of the representativeness heuristic on individuals' behaviors include different outcomes. For instance, individuals might underweight older information and overweight recent information, as they believe that the former is less representative than the latter (De Bondt & Thaler, 1994; Grether, 1980); individuals might tend to underweight large numbers and overweight small numbers, as they believe that the former are less representative than the latter (K. Baker & Nofsinger, 2002; Tversky & Kahneman, 1974). One example stated by Tversky and Kahneman (1971), was the "law of small numbers", which means that individuals tended to falsely view a randomly selected sample as highly representative of the population. Pham (1998) argued that evaluation based on the representativeness heuristic is actually made according to whether individuals believe that an event can be considered representative of another event. In

other words, this heuristic might be highly subjective because it depends on what an individual prefers to believe. Hence, the way in which representativeness influences investment decisions can vary: one might choose to believe that the past returns of a stock represent its future return (G.-M. Chen, Kim, Nofsinger, & Rui, 2007), or one might choose to believe that the return on a stock from a certain industry represents the return on all the companies from that industry (M. Baker & Wurgler, 2007). Both of these subjective beliefs concerning representativeness might lead to an increase in stock market participation or simply increase individuals' investments in a given stock.

Another cognitive factor, as Hirshleifer (2001) stated, was sharpen and level. It indicates that while communicating or processing information, individuals tend to emphasize the information that they believe to be the main point and deemphasize other information that might confuse the main point (Hirshleifer, 2001). To my understanding, sharpen and level means that people tend to only listen to what they believe is important and neglect other information that challenges their beliefs. For instance, an experiment reported by Allport and Postman (1947), which required participants to describe the content of pictures, showed that women tended to pay more attention to clothes in the pictures while describing the pictures to others than did men. Sharpen and level has also been considered a psychological mechanism for how rumors are spread (R. A. Drake, 1989; Nkpa, 1975). Studies from various periods have found that rumors can significantly affect the stock market, especially when investors are unsure of the intrinsic value of a certain stock (R. K. Aggarwal & Wu, 2006; DiFonzo & Bordia, 1997; Rose, 1951). Specifically, R. K. Aggarwal and Wu (2006) noted that intentionally

spreading rumors was one method of stock market manipulation, which could increase the volatility, liquidity and returns of stocks. Furthermore, stock prices rise during the process of manipulation and fall afterwards. No empirical studies have been conducted to analyze how rumors might influence stock market participation. One of the existing studies that came the closest to directly addressing this issue was conducted by Antweiler and Frank (2004), who found that messages posted on message boards hosted by Yahoo! Finance and Raging Bull had a significant correlation with the stock market volatility, including during the internet bubble period. Antweiler and Frank (2004) also noted that the business press (Wall Street Journal), which represented the control group in their study, also used rumors from the message boards to craft eye-catching stories in their columns to win attention. Hence, in my opinion, it might be reasonable to assume that rumors have a significant influence on stock market participation for the following two reasons. First, those investors who are considering whether to participate in the stock market might also be unsure of the stocks' intrinsic value, which according to R. K. Aggarwal and Wu (2006), is the stage of the investment process that can be easily influenced by rumors. Hence, it is quite likely that rumors might encourage individuals to engage in stock market investment and hence increase aggregate stock market participation. Second, the media can influence stock market participation, which will be described in Subchapter 0. When the media is also involved in the spreading of rumors, the influence of rumors on stock market participation can be magnified.

The reasons that these two factors are not listed separately as cognitive dissonance and cognitive trust is that both representative heuristics and sharpen and level do not

necessarily have a direct impact on stock market participation. In the following subchapter, social factors that do have a direct influence on stock market participation will be discussed.

2.2.2 Influence of social factors

It can be challenging to strictly differentiate which factors make individual investors interested in stock market investment and which factors urge them to make the final decision and make the purchase. Based on observations of the large ups and downs in the financial market, such as market bubbles and financial collapses, what ultimately drives people to engage in purchasing or selling behavior is more related to social influence and less related to individual biases. Hence, in the following part, two social factors, 1) media and 2) interpersonal and group communication, will be presented. The mechanisms whereby social factors affect individual investors will also be discussed.

Media

Most extant studies on media and the stock market can be divided into two streams. One stream holds that the media influence investor emotions and their trading behavior and, in turn, the stock market. This stream is essentially in agreement noise trader theory and takes investors' irrationality into consideration (such as K. Baker & Nofsinger, 2002; Hirshleifer, 2001; Tetlock, 2007). To differentiate between the two, below, this first stream will be referred to as the media information influences stock performance

stream. The second stream holds that the information disclosed by the media forms part of the fundamental value of stocks. This stream supports the opinion that public information itself conveys the inherent value of stocks and considers that the reason that individual investors have failed to perform well in the stock market is their lack of information (such as Amihud et al., 2003; L. X. Liu, Sherman, & Zhang, 2009). This stream will be referred to as the media information conveys stock value stream below.

Generally, studies from these two streams have covered topics concerning the information coming from the media and its influence on stock market prices, expected stock returns, IPOs during the internet bubble, IPO underpricing, etc. (see Bhattacharya, Galpin, Ray, & Yu, 2009; L. Fang & Peress, 2009; L. X. Liu et al., 2009; Tetlock, 2007). For instance, a study from the media information influences stock performance stream focused on media pessimism and stock market prices (Tetlock, 2007). In the study, a popular Wall Street Journal column *Abreast of the Market* from 1984 to 1999 was used to detect pessimism in the media. The results showed that 1) high media pessimism led to significant declines in stock prices, 2) both high and low media pessimism led to high trading volume in the stock market, and 3) low market return led to high media pessimism. Media pessimism was defined as the share of pessimistic words used in the column, and the reason that Tetlock (2007) chose this column was because it has been considered as the longest accessible column among all the columns in the Wall Street Journal. Tetlock (2007) explicitly noted that these results supported the theory of noise traders in the stock market, which was in contrast to the theory of rational traders. The concept of *noise traders* was developed by Kyle (1985) and describes traders who

neglect the intrinsic value of stocks and trade randomly and irrationally based on noise (also see F. Black, 1986; De Long, Shleifer, Summers, & Waldmann, 1990). Noise traders are portrayed similarly to irrational individual investors, which have been mentioned many times in this dissertation.

Another study from the media information conveys stock value stream focused on media information and stock market return. L. Fang and Peress (2009) found that stocks with no media coverage had significantly higher returns than stocks with high media coverage. They explained this phenomenon as follows: information disclosed by the media should be regarded as one determinant of the intrinsic value of stocks, such that a high stock return represents compensation for low investor recognition. Interestingly, in my opinion, their results could also be explained from the perspective that information influences stock market performance. L. Fang and Peress (2009) considered stock returns on a monthly basis, meaning that their calculations were based on the different stock prices observed over a one-month period. In other words, such a measure of return does not include dividends, which can be influenced by issuers (or the companies) but are highly dependent on the market situation, which issuers (or companies) have little power to influence. As a result, in my opinion, the explanation that the media influences noise traders' behavior and, in turn, influences stock returns makes better sense than the explanation that issuer compensates its investors through stock returns. If the media coverage of a certain stock is high, it consequently attracts the attention and interest of a number of noise traders. Combined with the results of Tetlock (2007), namely, that both high and low media pessimism lead to large amount

of trading, it is possible to conclude that high media coverage leads to a high volume of trading. A high trading volume, in general, might lead to low stock returns (Campbell, Grossman, & Wang, 1992). Once a low market return is observed, this might trigger high media pessimism and lead to a large amount of trading (Tetlock, 2007). Consequently, in my opinion, high media coverage might place related stocks in a loop where pessimism and low return occur in a cyclical pattern.

Regarding IPOs, the media have been found to have a direct impact on underpricing and trading volume. For instance, public information influenced investors' decisions regarding IPO stocks (Pollock & Rindova, 2003). By studying 225 IPOs, Pollock and Rindova (2003) showed that underpricing was negatively correlated with the volume of media-provided information and that stock trading volume was positively correlated with the volume of media-provided information; both of these correlations decreased over the long term.

However, less universal findings were provided by L. X. Liu et al. (2009). By using the number of articles and the amount of underpricing, they studied IPOs with offer prices that were revised after the initial filing range had been published. They found that for IPOs that had a revised price that was higher than the midpoint of the initial filing range, the number of articles was positively correlated with the amount of underpricing. This correlation was found to be insignificant for IPOs that had a revised price that was lower than the midpoint of the initial filing range. They attribute this phenomenon as indicating that issuers use underpricing to compensate investors for their information. This result is similar to that of Hanley (1993) that underpricing was

more significant for IPOs that had a revised price above the initial filing range. Interestingly, Hanley (1993) did not include media information as a variable.

Whether the media information really play such a role in underpricing as reported by L. X. Liu et al. (2009) is questionable. Moreover, as argued previously, it is quite unlikely that issuers or companies can precisely control the extent to which they compensate their investors, provided that they wished to. One example is the extraordinary returns on IPOs during the internet bubble period from 1999 to 2000, when the IPOs' mean first-day return was over 50 percent (Ritter, 2014a). Numerous studies have been conducted to analyze the reasons for the internet bubble phenomenon (e.g. Bhattacharya et al., 2009; DuCharme et al., 2001; O'Brien & Tian, 2006; Ofek & Richardson, 2003). Among these contributions, Bhattacharya et al. (2009) focused on the media's effects on the internet bubble. Their results showed that, in general, the tone of media coverage was positively correlated with the ups and downs of the prices of internet IPO share prices. Specifically, media coverage had a more positive tone when addressing internet IPOs when their stock prices were rising and a more negative tone when their stock prices were falling. Bhattacharya et al. (2009) included a massive amount of data, for instance, 171,488 news items were categorized into three groups: positive, neutral and negative news. 458 internet IPOs from 1996 to 2000 were studied, together with a comparable group of 458 non-internet IPOs. Specifically, from 1 January, 1997 to 24 March, 2000, the internet IPO sample earned cumulative return of 2,016 percent and the non-internet IPO sample earned only 370 percent. Interestingly, Bhattacharya et al. (2009) concluded that of the 1,646-percent differences between the

return of the internet IPO group and the non-internet IPO group, only 2.9 percent can be attributed to the influence of the media.

If the media can only be attributed a trivial influence on the abnormally high returns observed during the internet bubble period, it might be reasonable to assume that media also play a relatively small role in influencing IPO underpricing in general. In my opinion, media information is more likely to be the source of public information, which forms the bases for noise traders or irrational investors' interpretations. These interpretations could vary: noise traders might believe media information and transmit to their peers, and the cumulative effect of such behavior might mean that the market moves according to the news (Bhattacharya et al., 2009; Bondt & Thaler, 1985); alternatively, they might act in the completely opposite manner to avoid herding, as they believe that others would act in accordance with the news; finally, they could simply ignore such information, as they believe that the media offer irrelevant, storytelling and exaggerated information (K. Baker & Nofsinger, 2002). Hence, it is difficult to draw a universal conclusion regarding whether the media influence the stock market in a positive or negative way because, ultimately, stock prices are a consequence of aggregate demand and supply. While the media represent an information transmission channel, their influence tends to be dispersed rather than aggregated, especially when compared with the other information transmission channel: interpersonal and group communication, which will be discussed in the following subchapter.

Interpersonal and group communication

The conclusions regarding the effect of interpersonal and group communication on stock market participation tend to be less varied than those concerning the effect of the media. In general, 1) the participation of neighbors, community members and family members, 2) peer performance in the stock market, and 3) the sociability of an individual all have a positive influence on one's likelihood of participating in the stock market (J. R. Brown, Ivković, Smith, & Weisbenner, 2008; Hong et al., 2004; Kaustia & Knüpfer, 2012; G. Li, 2014).

In my opinion, the existing studies can be viewed from three perspectives. First, the stock market participation of the group members. Second, the performance of the existing investors in the group. Third, the sociability of the potential investors. The participation of group members provides potential investors with an environment to familiarize themselves with, or even trust, the stock market; the performance of the peers in one's group provides potential investors with a channel to obtain private information; and sociality could be used to describe the willingness of a potential investor to be involved in a group. Hence the following part will review the existing literature from these three perspectives.

From the first perspective, two representative studies have been conducted on the effects of stock market participation by group members on the potential investors. One of which is J. R. Brown et al. (2008), which studied the effects of the community on its members. Specifically, they found that an individual's likelihood of stock market participation was positively correlated with the fraction of stock market investors in the

local community. The correlation was higher in communities that were more sociable. The term *sociable* in their study was referred to “whether households are likely to be asked by neighbors for advice” (J. R. Brown et al., 2008, p. 1512). In other words, their results showed that the effect of participation in the community was driven by word-of-mouth communication. The other representative study was conducted by G. Li (2014) and focused on a closer type of interpersonal group relative to the neighborhood. The factor that G. Li (2014) studied was the likelihood of stock market participation among direct family members, specifically between parents and children. The results showed that the likelihood of participating in the stock market increased by 20 to 30 percent in the 5 years following parents or children becoming stock market investors. These studies did not indicate whether the first movers in the stock market were winners or losers. In other words, the peers’ and family members’ participation exerts an influence on individuals regardless of the outcome of the investment. To my understanding, these results can be interpreted as indicating that some individuals are inclined to take actions that keep them involved in the group, even when such actions are potentially risky or costly.

From the second perspective, Kaustia and Knüpfer (2012) provided results regarding the performance of the existing investors within a group. By analyzing the local peers’ return in the stock market and the likelihood of an individual’s decision to enter the stock market, they found a significant correlation between these two factors. These two factors were found to be more strongly correlated in areas with more social learning opportunities. Interestingly, their findings also showed that when peers

experienced a negative return, this did not decrease individual participation. This result is in accordance with the studies mentioned above reporting that the investment outcome does not impact individuals being influenced by their peers. Kaustia and Knüpfer (2012) explained this through people's tendency to not discuss situations with poor results, such as losses in the stock market. In my opinion, this explanation is sufficient for groups characterized by less open interpersonal relationships but might be insufficient to explain groups characterized by closer interpersonal relationships, in which people tend to share everything, including poor results, for instance, family members. Hence, the possibility that people tend to take action in accordance with other group members regardless of the cost should be considered.

From the second perspective, by accounting for the sociability of the potential investors' in a group, Hong et al. (2004) found that the more social the households were, the more likely they were to participate in the stock market. They used the factors of whether participants knew their neighbors or went to church to measure sociability. In addition to the positive correlation between sociability and the likelihood of participating in the stock market, they also found that sociability influenced market participation to a greater extent in states with a higher stock market participation rate, in the U.S.

In general, all of the three abovementioned perspectives have a positive influence on the likelihood of individuals' participating in the stock market. The possible mechanisms driving these factors will be introduced in the following part.

The mechanisms underlying social factors

There are several cognitive biases or effects that might cause individuals to participate in the stock market when they are exposed to the influences of social factors. For instance, as Hirshleifer (2001) noted, these effects include the conformity effect, cognitive overload, and the availability heuristic.

The conformity effect, as noted in a set of experiments conducted by Asch (1951), argues that individuals tend to surrender their independent opinions in the face of group pressure, even if the general opinion in the group is incorrect. This is one possible reason that interpersonal and group communication affect individual investors' stock market participation.

Cognitive overload was explained by Hirshleifer (2001) as a cognitive mechanism that influences social factors. Cognitive overload belongs to cognitive load theory, which holds that the working memory of human beings is limited due to their cognitive capacity, especially while learning (De Jong, 2010). Thus, as its literal meaning, cognitive overload describes the scenario in which individuals' cognitive processing exceeds their cognitive capacity (Mayer & Moreno, 2003). Kirsh (2000) suggested four reasons creating cognitive overloads in the workplace, two of which are universally applicable. These two reasons are 1) too many tasks and 2) too many interruptions. These traits fit the characteristics of the media, the effect of which is that 1) individuals receive massive amounts information and thus have too many tasks to process, and 2) currently, most media information appears on the internet, some even in the form of popup messages, which might interrupt and interfere with individuals' attention. Indeed,

a study has found that, in regard to the influence of media information on cognitive load, media reports with rich information decrease information processing ability. In other words, media reports with rich information cause cognitive overload (Robert & Dennis, 2005). The direct result of cognitive overload is that it decreases learning efficiency (Mayer & Moreno, 2003). The application of cognitive load theory, in the content of consumer decision making, is that when the information is controlled, consumers can make decisions that better match their preferences and be more confident in their judgments (Ariely, 2000). To date, no study has been conducted on cognitive overload and its influence on individual investors' decision making. However, it might be similar to the context studied by Ariely (2000), as stock purchases also reflect investors' preferences and their reliance on their own judgments. Future studies could analyze the correlations between cognitive load and investors' decision making. Such studies could be highly significant because investors are increasingly likely to consume news through the internet and mobile devices such as tablets and smart phones. This means of retrieving messages and news, in my opinion, creates greater cognitive overload than do conventional media outlets such as newspapers, radio and TV.

The availability heuristic has been identified as another cognitive mechanism that influences social factors (Hirshleifer, 2001). Proposed by Tversky and Kahneman (1973, 1974), the availability heuristic describes how people estimate the likelihood of an event based on how easily it can be brought to mind. An example offered by Tversky and Kahneman (1974) was that one might estimate the likelihood of a heart attack by recalling the similar situations that occurred among one's acquaintances. Similarly, an

investor might estimate the likelihood of winning in the stock market by recalling similar situations that occurred to his or her acquaintances. Thus, the more positive outcomes that an investor's peers have, the easier it is for the investor to recall such situations, which leads to him or her to the conclusion that the likelihood of winning in the stock market is high. In other words, the availability heuristic leads investors to estimate stock market performance based on the experience of their peers.

In addition to the factors mentioned above, Kaustia and Knüpfer (2012) attributed the effects of interpersonal and group communications to two other reasons, namely, social learning and individual sentiment. Social learning provides individual investors with the occasion and possibility to form positive sentiments about the stock market, such as high expectations for the return on their own performance if they would have invested. The authors argued that such high expectations and sentiments drive potential investors to enter the stock market. Another aspect of social learning is called *keeping up with the Joneses*, meaning that individuals might simply wish to keep up with their peers financially. As cited by Kaustia and Knüpfer (2012), this effect usually leads to imitation behavior among peers, especially for behaviors relating to financial issues (also see D. C. Ling, 2009).

Of course, there are other factors that cannot be categorized as cognitive factors or social factors but nevertheless influence individual investors' participation in the stock market, such as income, age, and wealth. Furthermore, at the micro level, windfall gains are positively correlated with participation (Andersen & Nielsen, 2011). At the macro level, increased wage inequality was also found to affect stock market participation

(Favilukis, 2013). Additionally, the ease with which investors are able to access the stock market is also an influential factor, as Bogan (2008) found that, in recent decades, the popularization of computers and the internet significantly increased the likelihood of stock market participation, the effect of which is equivalent to a \$27,000-increase in household income.

All of the abovementioned factors have either a direct or indirect influence on stock market participation. Note that, in this dissertation, when referring to stock market participation, it is assumed that investors have already purchased at least one stock. In the following subchapter, these investment behaviors and factors relevant to them will be discussed.

2.3 Individual investors and long-term IPO underperformance

Once the investors have begun to participate in the stock market, it is assumed that they have purchased at least one unit of IPO stock. Hence, according to investor willingness to retain a stock, subsequent investment behaviors include: 1) sell the IPO stock they purchased when entering the stock market, 2) hold the IPO stocks they have purchased, and 3) repurchase the same IPO stocks that they purchased previously. The reason that this subchapter is presented in this manner is that, in the long term, selling behavior will increase the level of underperformance, repurchasing behavior will decrease the level of underperformance, and holding behavior will have no influence. This is a conclusion simply based on *the law of supply and demand* (Gale, 1955). Thus, the aim of this subchapter is not to explain how each factor influence long-term IPO

phenomena but to identify which factors cause these phenomena. Thus, in the following parts, cognitive factors and affective factors will be discussed with respect to these investment behaviors. Because social factors function similarly to how they were described in Subchapter 0, they will not be explained in detail.

2.3.1 Influence of cognitive and affective factors in selling

Selling behaviors in the stock market generally mean that investors change their paper gain or loss into a realized gain or loss (Odean, 1998a; Thaler, 1999). In other words, a true increase or decrease in one's assets occurs when stocks are sold. A study by Thaler (1999) found that, emotionally, individuals reacted to these two types of gains and losses differently. Using loss as an example, Thaler (1999) noted that a realized loss was actually more painful than a paper loss. With the intention to avoid stronger pain, individuals tended to sell stocks when they were still winning. Existing studies on selling behavior have primarily focused on the timing of a sale. For instance, Odean (1998a) discussed whether investors were unwilling to sell losing stocks; Shefrin and Statman (1985) noted that investors were selling losing stocks too slowly and winning ones too quickly. The phenomenon whereby investors tend to hold losing stocks and sell winning stocks is called the *disposition effect* (Shefrin & Statman, 1985; Weber & Camerer, 1998).

Two studies have provided empirical evidence of the disposition effect. One was conducted by Odean (1998a). Using data from 10,000 trading accounts, the result was that from 1987 to 1993, for those trades involving the sale of an entire portfolio, the

aggregate realized losses equaled 15.5 percent of the total paper losses, and the aggregate realized gains equaled 23.3 percent of the total paper gains. In other words, the different between the percentage of realized gains and that of losses was 7.8 percent, which accounted for half of the total percentage of realized losses. The other study was conducted by Grinblatt and Keloharju (2001b). Their results showed that the larger a loss was, the less likely a sale would be made compared to the case of a corresponding gain. Specifically, by creating dummies for stocks that experienced losses greater than 30 percent of total capital, a 0.32 decrease in the likelihood of selling was found relative to the baseline cases of a capital gain or no price changes. For stocks that experienced losses of less than 30 percent of total capital, a 0.21 decrease in the likelihood of selling was found relative to the cases of a capital gain or no price change. Grinblatt and Keloharju (2001b) used a dataset including 293,034 entries from Finnish stock market that covered nearly all Finnish investors.

Although different scholars tend to attribute the delay in selling losing stocks to different reasons, the consensus is that investors exhibit the disposition effect. Hence, in the following subchapter, the possible theoretical reasons for disposition effect will be explained.

Mental accounting: sell to avoid pain

A thorough explanation of mental accounting was provided by Thaler (1999). It is defined as “the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities” (Thaler, 1999, p. 183).

The financial decisions processed using mental accounting are usually different from those processed using financial accounting, as the cognitive activities involved are likely to make individuals less rational. For instance, for a given amount of money, checks that arrive in the mailbox are more likely to be spent than are paper gains because individuals tend to categorize these two forms of income into different accounts. Thaler (1999) called this the *mailbox effect*.

As previously mentioned, Thaler (1999) also emphasized that the feelings created by a realized gain or loss differ from those generated by a paper gain or loss. This is because when the gain and loss are realized, the relevant tax needs to be paid, and relevant information has to be declared to others, such as family members or even clients whose money is involved (Shefrin & Statman, 1985). In other words, realized gains and loss are, to some extent, final. A realized loss triggers more pain for investors than does a paper loss, which leads individuals to have the tendency to sell stocks when they are still winning.

Furthermore, an empirical study found that investors tend to treat one individual stock as one account instead of treating one portfolio as one account (Barberis & Huang, 2001). Similar to the example offered by Shefrin and Statman (1985), if an investor has a portfolio composed of stock A and B, and assuming that stock A is losing and stock B is winning, a rational investor would sell stock A and use the proceeds to purchase more of stock B. However, investors who process information using mental accounting, selling stock A means, mentally, closing the account of stock A at a loss, despite that the portfolio as a whole might still be winning. The feeling that closing a mental account

at a loss can cause greater pain for these investors than they would experience if they simply left the loss on paper. Hence, even if the whole portfolio is winning, these investors would nevertheless be more willing to sell the winning stock (stock B) inside of a portfolio and keep the losing one (stock A).

Pride and regret: sell to maintain pride or avoid regret

In addition to mental accounting, Shefrin and Statman (1985) explained the disposition effect from the perspective of maintaining pride and avoiding regret. “Regret is an emotional feeling associated with the ex post knowledge that a different past decision would have fared better than the one chosen” (Shefrin & Statman, 1985, p. 781). Pride is the opposite feeling of regret.

Gross (1982) noted that gaining positive returns in the stock market is interpreted as having made the right judgments and decisions, which creates pride; however, obtaining negative returns is interpreted as having made judgments and wrong decisions, which creates regret. Such feelings of regret might become more pronounced when investors have to announce their loss to others, such as the tax office, family members and clients (Gross, 1982, as cited in Shefrin & Statman, 1985). Hence, to maintain pride and avoid regret, investors have the tendency to sell winning stocks and hold losing stocks.

Moreover, it has also been noted that regret is a stronger feeling than pride (Kahneman & Tversky, 1979). Thus, investors might have the tendency to hold both winning and losing stocks for a longer time to avoid regret when the stocks’ prices rise

in the future (Shefrin & Statman, 1985). This type of regret, which is different from the ex post regret, is anticipated regret, which is based on individuals' anticipation of how they might feel in the future (Muermann & Volkman Wise, 2006). Hence, one might ask what the future returns of winning or losing stocks might be. Interestingly, studies have argued that winning stocks generally tend to continue winning and that losing stocks tend to lose over relatively short period. However, over a longer period of time, reversals between winning stocks and losing stocks might occur. For instance, an empirical study by Jegadeesh and Titman (1993) noted that, over a 3 to 12-month holding period, the strategy that obeyed the rule "buy stocks which have performed well in the past and sell stocks that have performed poorly in the past" (p. 65) created significant positive return. However, over a period of 36 months, a losing portfolio was found to gain over 25 percent more than the previous winning portfolio, according to Bondt and Thaler (1985).

In other words, investors whose decisions will be influenced by disposition effect will, over the short term (3 to 12 months), sell winning stocks that will continue winning and retain losing stocks that will continue losing. Both of these behaviors create regret among investors; however, the results of these two behaviors are different: one result is losing more (retaining the losing stock), while the other result is earning less (selling the winning stock). Indeed, Fogel and Berry (2006) found that there were more respondents who reported regret triggered by holding a losing stock for too long than those selling a winning stock too soon. According to Fogel and Berry (2006), this can be explained by individuals' strong desire to avoid anticipated regret. Anticipated regret,

as stated above, is the anticipation of future feelings (Muermann & Volkman Wise, 2006). Indeed, Cooke, Meyvis, and Schwartz (2001) also noted that when making purchasing decisions, consumers would rather forego the option that maximizes their expected value than increase the possibility of anticipated regret.

Ultimately, maintaining pride and avoiding represent a further explanation for the disposition effect, which encourages individuals to hold losing stocks for too long and sell winning stocks too soon.

Reference point: sell when it is above the reference point

The reference point is the point based on which the losses and gains are calculated (Kahneman & Tversky, 1979). It has been argued that people tend to take more risks when there will be possible losses in the future, i.e., when the future amount is lower than the reference point, and people tend to take fewer risks when there will be possible gains, i.e., when the future amount is above the reference point (Weber & Camerer, 1998). Such different risk taking preferences are due to loss aversion, which states that for a given amount of loss and gain, the negative feeling caused by the loss is stronger than the positive feeling brought by the gain (Kahneman & Tversky, 1984; Tversky & Kahneman, 1991).

Indeed, when a share's price is above the reference point, typically the purchasing price of a share (Weber & Camerer, 1998), investors tend to take less risk with the gains, and hence are willing to sell the shares. Conversely, when the share price is below the purchasing price, investors tend to take more risk with the loss, and hence are willing

to hold the shares in the hope that the share price will rise again.

To conclude this discussion of the explanations for the disposition effect, most existing studies have adopted the reference point and loss aversion as the explanations for the disposition effect (Barberis & Xiong, 2009; Weber & Camerer, 1998; Youki, Mardyla, Takenaka, & Tsutsui, 2013). Furthermore, since the disposition effect was empirically verified, research has primarily focused on questions such as what types of people exhibit a stronger disposition effect than do others. For instance, a study using data from the Taiwan stock market showed that education and the status of a gain or loss were two important factors influencing the disposition effect: the disposition effect was found to be stronger in the group with lower education and facing the losing condition (Goo, Chen, Chang, & Yeh, 2010). Similarly, the disposition effect was found to be stronger among individuals who were less wealthy and had less trading experience (Dhar & Zhu, 2006).

The reason that the disposition effect has been discussed as the main theme in the subchapter on selling is that this effect should be closely related to IPO flipping activity. This is because, on the one hand, many IPOs have been significantly underpriced, which means that if investors would have been allocated the IPO shares in the primary market, they would have been highly likely to sell the shares in the secondary market due to the disposition effect. On the other hand, if investors believe that IPOs might experience underperformance in the long term, according to the reference point and loss aversion, investors will be unwilling to take risks when they are already winning, and hence they will sell the stocks when they see the gain.

Empirical support for this position was found by studying the correlations between IPO trading volume and the disposition effect (Kaustia, 2004). The result showed that trading volume was significantly higher for IPOs with greater underpricing. In other words, IPO trading volume was significantly larger for IPOs with prices in the secondary market that were significantly higher than their initial prices. For IPOs with prices in the secondary market that were lower than their initial prices, trading volumes increased significantly on the day when the secondary market prices exceeded the initial prices. Kaustia (2004) explained this by the reference point, here, the initial price of IPOs.

Hence, the disposition effect plays a role in flipping activities. As stated in the previously mentioned study from Dhar and Zhu (2006), professionals were found to exhibit less of the disposition effect than were investors with less trading experience. From the perspective of decreasing flipping activities, it is reasonable to include more professional investors, investors with more trading experience, or institutional investors in the IPO distribution in the primary market.

However, the abovementioned approach is based on the assumption that investors treat the primary prices of IPOs as the reference point. What if the reference point were changed to another price, such as the expectation price? Odean (1998b) noted the likelihood of investors forming their reference point using their expectations of future stock prices. According to that study, it is possible that a reference point could be created based on the expected future stock price, which could thus be used as another method to decrease flipping activities to protect fragile IPO prices in the secondary

market. In other words, issuers and underwriters should create a convincing future price for investors to expect as a reference point, which should be higher than the initial price. Theoretically, this method might also attenuate flipping of IPO shares and prevent substantial selling volumes once the secondary prices exceed the initial prices, as stated by Kaustia (2004).

Future studies could disentangle the relationship between the disposition effect and IPO prices by focusing on other possible explanations for selling behaviors, such as mental accounting and affective factors related to pride and regret. Surveys or lab experiments could be performed by simulating IPO prices in both the primary and secondary markets. Specifically, investors with IPO investment experience should be asked to participate in the survey, and questions related to mental accounting, anticipated regret and pride should be asked. The lab experiment should employ a 3-by-2 design, which includes three subgroups under two conditions. Group One would cover IPOs that are underpriced, i.e., the IPOs with share prices on the initial date that are higher than the initial prices; Group Two would cover the IPOs that are overpriced, but their prices in the secondary market will exceed the initial price at some point after the initial date; Group Three would cover IPOs that are overpriced, but their prices in the secondary market will not exceed the initial price, i.e., IPOs with share prices on the initial date that are lower than their initial prices and will consistently be lower for the remainder of the experiment. The two conditions should be: a first condition under which participants are not allowed to change their selling decision once it is made; a second condition under which participants are told that they can change their selling

decision in a later time during the experiment. This control would be used to study whether regret plays a role in the disposition effect in the case of IPOs and the combined results of regret and the reference point.

In addition to the disposition effect as the main psychological factor for selling behaviors, studies have found that another financial factor for selling behavior in the form of tax considerations. For instance, Odean (1998a) found that there was a reverse in the willingness to realize paper losses and paper gains in December in contrast to the year as a whole. As stated above, in his sample with over 10,000 accounts' trading records, 15.5 percent of the total paper losses and 23.3 percent of the total paper gain were realized in the entire year; however, 19.7 percent of the total paper losses and 16.2 percent of the total paper gains were realized in December. Odean (1998a) noted, "tax-motivated selling is most evident in December" (p.1775). Due to the desire to pay less tax, people are more reluctant to sell winning stocks. Hence for IPO companies, it might be helpful to decrease flipping activities by setting the initial date in December. Thus far, tax considerations have not been studied in correlation with IPO flipping activities, and hence it could also be considered a promising subject for future study. Because this factor is non-psychological, further discussions will not be provided here.

2.3.2 Influence of cognitive and affective factors in holding

Among the three investment behaviors, holding can occur for various reasons. In other words, selling and repurchasing require investors to either sell or purchase to change the current holding situation. By contrast, holding behavior does not require

investors to do anything. Hence, in this dissertation, holding behavior will be categorized into two scenarios: 1) passively hold current stocks and 2) actively hold current stocks. Specifically, passive holding describes the scenario in which investors simply “do nothing” and no active decision-making process is involved. Active holding, on the contrary, describes the scenario in which investors decide to hold stocks after comparing the pros and cons of holding, which involves an active decision-making process.

Passive holding behavior, the endowment effect, status quo bias, and loss aversion

The term endowment effect was coined by Thaler (1980). As stated above, it describes the phenomenon whereby individuals demand more to give up an item than what they would pay for it. Thaler (1980) introduced the endowment effect from the perspective of consumer behavior and explained by consumers’ incapability of differentiating a sunk cost from an incremental cost and their desire to prevent regret. Specifically, a sunk cost refers to the historical cost that one has already paid in the past, which should be neglected when making rational decisions because it does not influence future income (Baumol & Willig, 1981). The primary applied areas of sunk cost are decision making in general project investment (Garland, 1990), decision making in risky situations such as gambling (Zeelenberg & Van Dijk, 1997), and strategy making in marketing (Kessides, 1986). Regret and anticipated regret were introduced in Subchapter 0 and hence will not be explained in detail here. Both the sunk

cost effect and regret avoidance have a tendency to increase the endowment effect and hence mean that investors will tend to retain current assets because they demand a higher bid than what they originally paid for them.

Status quo bias, as noted by W. Samuelson and Zeckhauser (1988), is the tendency of people to do “nothing or maintaining one’s current or previous decision” (p.7). In their experiments, participants were found to exhibit significant status quo bias in making various decisions. Specifically, the extent of status quo bias was observed to be positively correlated with the number of options and negatively correlated with the strength of an individual’s preferences. W. Samuelson and Zeckhauser (1988) primarily applied status quo bias to consumer decisions and offered examples such as beer drinkers’ brand loyalty being primarily due to such bias. Theoretically, in the stock market, investors also tend to exhibit status quo bias because they are continually exposed to numerous choices. For instance, in mutual fund investment, status quo bias was found to be empirically significant in the U.S. equity mutual fund market, where investors tend to continue choosing what they have previously chosen, even when the choice was no longer optimal (Kempf & Ruenzi, 2006).

Loss aversion means that for a given amount of loss and gain, the negative feeling caused by the loss are stronger than the positive feelings generated by the gain (Kahneman & Tversky, 1984; Tversky & Kahneman, 1991). As discussed in the previous subchapter from the perspective of selling, investors tend to sell winning stocks but hold losing stocks. Hence, combined with the results from Kempf and Ruenzi (2006), in general, investors tend to hold their current investment, regardless of whether

it maximizes their income or it starts to lose.

Kahneman, Knetsch, and Thaler (1991) used the word *anomalies* to describe the relationships among the endowment effect, status quo bias and loss aversion. They noted that these three factors are similar. For instance, status quo bias can be used as an example of the endowment effect, and it can also be considered an implication of loss aversion. Indeed, in the context of stock market investment, all three factors lead to passive holding behaviors, namely, doing nothing but maintaining status quo. Investors either have the intention to hold the shares in anticipation of receiving a higher price than they had paid (endowment effect), hold the shares because the situation has been relatively unchanged for some time (status quo bias), or hold the shares because losing might lead to greater pain than the pleasure generated by the same amount of winning (loss aversion).

K. Baker and Nofsinger (2002) noted the influences of such factors in the context of stock market investment. Specifically, the endowment effect encourages investors to avoid making choices, especially when there is a large quantity of other options in the stock market, and status quo bias encourages investors to hold what they obtain by default. Loss aversion, as noted, increases the tendency for investors to hold losing stocks that they have already purchased, as they become more willing to take risks when they are losing than they would be if they were winning (Hirshleifer, 2001).

If these three factors are applied to IPO investment, a general picture of how investors would like to hold the shares can be depicted from various perspectives. Specifically, from the perspective of the endowment effect, investors prefer to hold

their IPO shares as long as the current market price is below the initial price, and they still tend to hold their shares even in some cases when the market price is higher than the initial price (Kahneman, Knetsch, & Thaler, 1990; Kahneman et al., 1991). From the perspective of status quo bias, investors prefer to hold the shares in the secondary market, and they tend to hold share in current IPOs in proportion to the number of available options in the stock market. Status quo bias will be weaker if investors have strong preferences among the currently available options (Kempf & Ruenzi, 2006; W. Samuelson & Zeckhauser, 1988). From the perspective of the loss aversion effect, investors tend to hold their shares, especially when the price in the secondary market is lower than the initial price, as they become more willing to take risks when facing losing situations (Tversky & Kahneman, 1991; Youki et al., 2013).

In general, passive holding activities are caused by investors' biases that make the holding option attractive for investors, either from the cognitive perspective or the affective perspective. Conversely, active holding activities reflect the opposite scenarios from passive holding and will be introduced in the following part.

Active holding behavior and self-control

When investors are actively holding a stock, an active decision making process is involved, including comparing the pros and cons, even if such decisions might cause psychological discomfort. Specifically, according to the concept of cognitive dissonance as introduced by Festinger (1962), dissonance occurs when conflicts arise between what one knows or believes and what one does. For instance, if investors'

cognitive bias leads them to intend to sell stocks while rationality or a new source of information leads them to the conclusion that they should hold the shares, this creates dissonance. Empirical studies have found that cognitive dissonance causes psychological discomfort, which can be decreased by using a dissonance reduction strategy (Elliot & Devine, 1994).

Self-control, according to Muraven and Baumeister (2000), reflects one's "attempts to change the way he or she would otherwise think, feel, or behave" (p. 247). The reason for exerting self-control is to optimize long-term outcomes (Kanfer & Karoly, 1972). For instance, deferring consumption is a typical example of self-control, which is perceived as a struggle between desire and willpower (Hoch & Loewenstein, 1991). Desire represents the "initiating hedonic force", and willpower represents the "strategies used to overcome desire" (Hoch & Loewenstein, 1991, p. 498).

Considering self-control and its relationship with the affective factors, Hirshleifer (2001) noted that self-control is usually involved when moods and feelings are related. Such moods and feelings are the affective factors mentioned in Subchapter 0. Moods and feelings such as greed and fear are often considered the main affective factors involved in a financial crisis (Reavis, 2009; Shefrin, 2002). At the macro level, a financial crisis occurs during a bull market and, usually, after an abrupt change in stock prices. In a bull market, the constant growth of stock prices encourages investors to purchase stocks, a behavior driven by greed, and abrupt price changes usually trigger large-scale selling activities, which are driven by fear (Westerhoff, 2004). At the micro level, by observing 80 traders on a daily basis for a five-week period, Lo, Repin, and

Steenbarger (2005) found that those traders who experienced certain emotions to a greater extent tended to have poorer performance in the stock market. These emotions include fear and anger in response to monetary losses and happiness or greed regarding monetary gains. Hence, from the perspective of affective factors, self-control can not only decrease the likelihood of a financial crisis by decreasing panic-driven selling behaviors in the stock market but also help investors to improve their performance in the stock market by reacting less strongly to their emotions. In other words, if investors exhibited self-control, acted against their initiating affective states and, therefore, held stocks for longer than they would if they were driven by their emotions, fewer financial crises would occur and better stock market performance would be achieved.

Regarding self-control and its relationship with the cognitive factors, Shefrin and Statman (1985) explicitly argued that the disposition effect is closely related to self-control. Specifically, they argued that investors have to control themselves and not hold losing stocks for too long. They used examples from Kleinfield (1983) involving frequent traders who strictly follow to their rules concerning losses: they sell stocks immediately once amount of the loss exceeds their limit, which can vary from 5 to 10 percent of their original capital. A professional trader who had nearly 20 years of stock market experience stated: “when you’re breaking in a new trader, the hardest thing to learn is to admit that you’re wrong. It’s a hard pill to swallow. You have to be man enough to admit to your peers that you’re wrong and get out” (Kleinfield, 1983, as cited in Shefrin & Statman, 1985, p. 783). Analogously, investors should be self-controlled and defer selling when a stock is winning. For instance, Odean (1998b) noted that, in

general, investors traded too frequently in the stock market because, among other reasons, of overconfidence. This overconfidence means that investors tend to sell winning stocks too soon, with the result that the actual returns were less than their anticipation, sometimes even barely sufficient cover their costs. Hence, regarding the cognitive factors, self-control can help to improve investors' performance by trading less frequently, specifically by holding winning stocks longer than they would were they affected by their cognitive biases.

If active holding behaviors are applied to the IPO context, investors could be perceived as rational investors who will focus on the intrinsic value of the IPO shares and companies, instead of engaging in flipping activities.

To conclude, self-control is principally reflected in active holding behaviors, in the form of controlling both affective factors and cognitive factors. Because the concept of self-control was defined as having a positive connotation, with the goal of optimizing long-term outcomes (Kanfer & Karoly, 1972), here, active holding behaviors are consequently also accorded a positive connotation. In the following subchapter, cognitive and affective factors will be introduced in a less positive way because the discussion of these factors below will be mainly about biases.

2.3.3 Influence of cognitive and affective factors in repurchasing

Most of the existing literature on repurchasing stocks has considered the issuers' perspective, in which issuers repurchase the shares that they have issued in the market, for example, to change the proportion between equity and debt or to distribute excessive

debt (Dittmar, 2000; Ikenberry, Lakonishok, & Vermaelen, 1995; Netter & Mitchell, 1989). However, in this dissertation, repurchasing behaviors are defined as investors purchasing stocks that they have previously purchased in the past, or even simply continuing to hold these stocks. This definition is adopted because the individual IPO investors considered in this dissertation are those who have already purchased IPO shares, either in the primary market or in the secondary market. What will be discussed in this subchapter is a sequential purchase, which comes after the first purchase, and hence it is termed a *repurchase*.

Theoretically, relative to selling and holding behaviors, repurchasing can be interpreted as indicating that investors have the highest anticipation of the future development of stocks. However, repurchasing behaviors might also be driven by certain types of biases. In the following part, attachment bias and the gambler's fallacy will be introduced as two of the primary factors affecting individual investors' repurchasing behaviors.

Attachment bias and psychological ownership

Attachment bias, categorized by K. Baker and Nofsinger (2002) as one of the affective factors, emphasizes how investors feel. Attachment bias describes when people overlook an object's disadvantages and emphasize its advantages due to the emotional attachments people form during their interactions with the object. The object can be either a person, such as one's family member or friend, or an asset, such as one's home or stock (K. Baker & Nofsinger, 2002). K. Baker and Nofsinger (2002) noted that

one direct result of attachment bias in the stock context is that investors tend to ignore negative news related to the stocks to which they are attached. This might lead to investors holding stocks for too long or even repurchasing the same stocks. Specifically, the function of attachment bias in human cognition can be compared to an information filter, whereby investors overweight positive information and underweight negative information; in turn, false preferences might be formed regarding stocks to which the investor is attached, and hence repurchasing behaviors might be triggered.

Another factor that is similar to attachment bias is psychological ownership. Pierce, Kostova, and Dirks (2003) defined this as feelings of ownership towards other objects, both material and non-material. (Vandewalle, Van Dyne, & Kostova, 1995). For instance, one might have psychological ownership of one's own property, such as a house or apartment (Paré, Sicotte, & Jacques, 2006), or one's career such as one's specific position or employer (Pierce et al., 2001; Van Dyne & Pierce, 2004). Psychological ownership can be interpreted as either a cognitive factor or an affective factor because it is perceived through the cognitive process, but emotions simultaneously are triggered by the feeling of ownership (Pierce et al., 2003).

One of the motives to form psychological ownership, according to Pierce et al. (2003), is self-identity. Specifically, psychological ownership helps people to “define themselves, express their self-identity to others, and maintain the continuity of the self across time” (Pierce et al., 2003, p. 89). The conditions that help individuals to form psychological ownership include: 1) control over the object; 2) intimate knowledge of the object; and 3) investment and projection of the “self” on the object (Pierce et al.,

2001).

Because the abovementioned conditions are mostly likely to occur during interactions between individuals and non-material objects, the existing literature on the utility of psychological ownership concerns organizational psychology, such as individuals' psychological ownership of their jobs or their firms (Culpepper, Gamble, & Blubaugh, 2004; Pierce et al., 2001; Van Dyne & Pierce, 2004). For instance, Pierce et al. (2003) argued that psychological ownership, as one part of employee ownership, had a direct positive effect on employee performance. Similarly, Van Dyne and Pierce (2004) noted that psychological ownership had a positive effect on employees' working attitudes and behaviors, including organizational commitment, job satisfaction, self-esteem within the organization, and job performance.

In contrast to psychological ownership, the employee stock ownership plan (ESOP) has long been used in cooperation management as a scheme to incentivize employees and improve their job performance (Kruse et al., 2003). One study found that ESOP can improve companies' operating performance, even when stock prices are falling (Iqbal & Hamid, 2000). This result might provide indirect evidence that individuals are incentivized when they have a feeling of ownership, which might have a stronger effect than their wealth status.

In my opinion, the greatest similarity between psychological ownership and attachment bias is that they might both encourage individuals to overlook negative information or even neglect the financial benefit of the firm or stock involved. Hence, hypotheses that could be tested by future studies can be proposed that focus on

psychological ownership (or attachment bias) and stock repurchasing: the greater individuals' psychological ownership (or attachment bias) regarding their firms is, the more likely they will be to purchase the stocks of their firms; in the case of IPO companies, the greater individuals' psychological ownership (or attachment bias) regarding their firms is, the more likely they will be to repurchase the stocks of their firms in the secondary market. Consequently, such repurchasing behavior could decrease the likelihood of IPO underperformance in the long term.

The hot hand fallacy

If attachment bias and psychological ownership are understood to be formed over time due to non-financial reasons, then the occurrence of the hot hand fallacy can be attributed to financial considerations, i.e., the return on the stocks in which individuals have invested.

The hot hand fallacy is rooted in the *representativeness heuristic*. The representativeness heuristic, as previously stated, is the heuristic employed when individuals fail to estimate the probability of an event (Kahneman & Tversky, 1974). Specifically, people who believe in the hot hand fallacy tend to believe that their positive recent experiences will persist (Ayton & Fischer, 2004). The hot hand fallacy, according to Ayton and Fischer (2004), is caused by the positive recent experience of individual performance. It is antonymous with the term *the gambler's fallacy* and is mostly studied in lottery play (Clotfelter & Cook, 1993; Croson & Sundali, 2005). An empirical study found that this confidence based on small numbers is related to “the

randomness of the underlying process generating the events” (Burns & Corpus, 2004, p. 179). In other words, when individuals are exposed to the implication that the incidents that generate outcomes are nonrandom, individuals tend to exhibit the hot hand fallacy.

Investors also tend to exhibit such fallacies in the stock market. For instance, a typical example is that investors tend to predict future stock prices according to historical price information (Andreassen, 1988). Specifically, in an empirical study of 314 business school students, J. Johnson, Tellis, and MacInnis (2005) showed that when purchasing stocks, participants tended to purchase stocks that had won in previous rounds and sell stocks that had been losing. A trading strategy called the *momentum strategy* exists in the stock market, according to which traders purchase portfolios that had been winning over the last 3 to 12 months and sell portfolios that had been losing during the same period of time (Avramov, Chordia, Jostova, & Philipov, 2007; T. C. Johnson, 2002). This strategy was found to realize significant profits in firms with low credit ratings in the U.S. stock market (Avramov et al., 2007) but generated slight losses (approximately 0.5 percent per month) in the Japanese stock market from 1975 to 1997 (C. Liu & Lee, 2001). Neither of these studies was able to explain why this strategy is only partly effective. Richard Driehaus, who is considered the father of the momentum strategy, stated the philosophy of momentum strategy as buying stocks at high prices and selling them at even higher prices (KiHoon Jimmy & Stephen, 2012).

In my opinion, one of the reasons that this strategy could be effective in the stock market is because, in the stock market, many investors subscribe to the hot hand fallacy.

This fallacy encourages investors to believe that increases in stock prices are based on their previous experience and hence to neglect the intrinsic value of the stocks. As a result, it can be assumed that, the more believers in the hot hand fallacy there are among the investors of given stocks, the more likely the momentum strategy is to be effective when trading these stocks. This could be a possible explanation for the results of Avramov et al. (2007), indicating that significant profits were found only for stocks of companies with low credit ratings instead of those of companies with high credit ratings. Compared with stocks with high credit ratings, those with low credit ratings are more similar to lotteries (Kumar, 2009). The latter stocks might attract investors with a gambling attitude to participate in the stock market, and theoretically, such investors might be more likely to subscribe to the hot hand fallacy.

Thus, in the case of IPO stocks, which as previously noted, share many features with a lottery, the momentum strategy might also produce a significant profit because there are believers in the hot hand fallacy. Hence, repurchasing will occur in the secondary market, especially if the IPO shares were underpriced. One advantage of the momentum strategy in IPO trading is that whenever it is employed, it can prevent IPO prices from dropping. For instance, if the momentum strategy were followed immediately after the initial date, it might reduce flipping activities or increase the first-day return and lead to a high level of underpricing, and if the momentum strategy were applied in the long term, it might decrease the likelihood of IPO underperformance.

To conclude, according to attachment bias, psychological ownership and the hot hand fallacy, the repurchase of IPOs in the secondary market is not completely

impossible. In addition to the abovementioned cognitive and affective factors, other reasons, such as the event that investors were allocated fewer initial shares than they desired to invest in the initial market, might also lead to repurchasing in the secondary market. In other words, not all initial investors have the tendency to flip IPO shares, and not all stock market investors tend to follow the buy low sell high trading strategy.

De Bondt (1998) portrayed individual investors as having the following four characteristics while trading: “1) discover naive patterns in past price movements, 2) share popular models of value, 3) are not properly diversified, and 4) trade in suboptimal ways” (p. 831). These characteristics of individual traders demonstrate that most traders in the stock market are irrational, which is contrary to the assumption of the efficient market hypothesis (Fama, 1970). In this chapter, IPOs were reviewed from the perspective of investors and organizational investors and individual investors were discussed. Specifically, the differences in traits between actual individual investors and hypothetical rational men were reviewed in the subchapter relating to individual investors according to the process by which they engage in IPO investment. Cognitive, affective and social factors were analyzed throughout the process that influence investment decisions such as initial IPO investment and trading behaviors involving IPO stocks. The factors that might influence IPO underpricing and underperformance were also discussed (Figure 8). Many studies have been conducted on investment psychology in the context of investments in mature stocks, but very few studies have directly focused on investment in IPO stocks. This chapter also suggested several hypotheses, with the hope of informing future research.

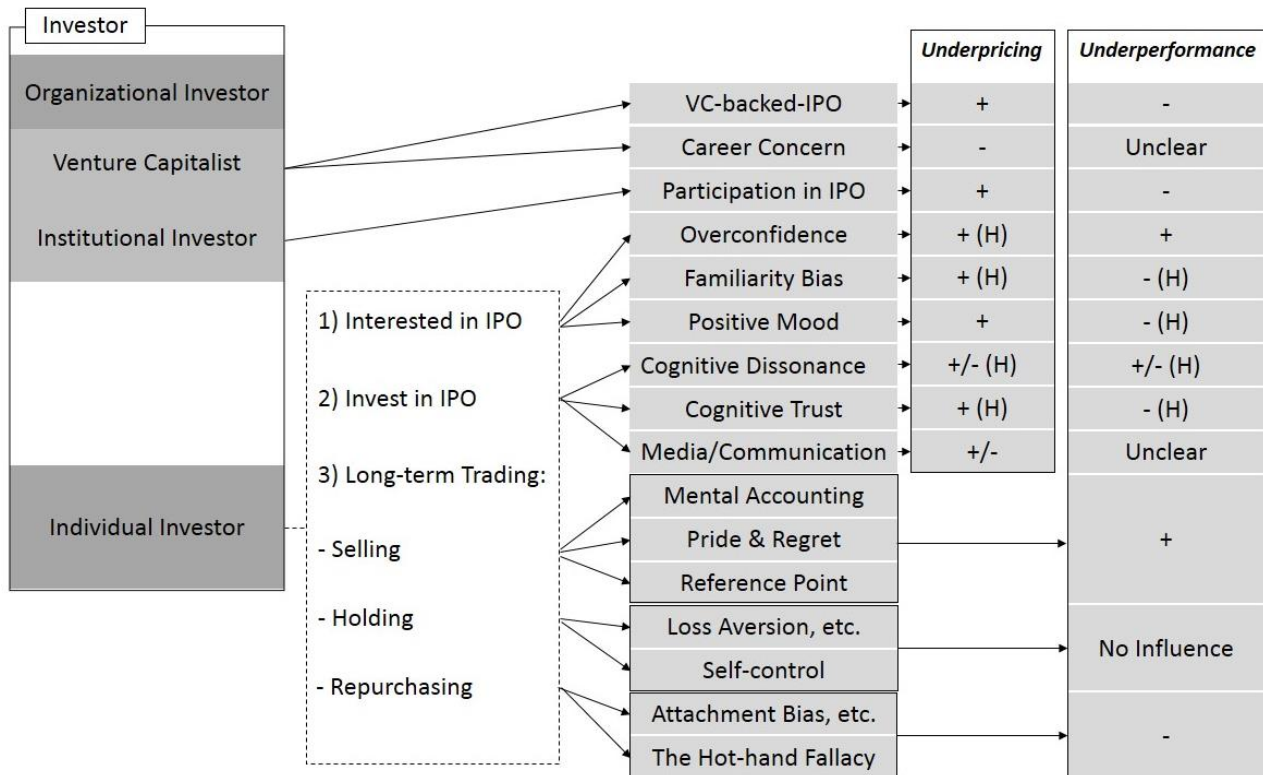


Figure 8 *IPO from the perspective of investors. The column in the middle represents parameters that influence underpricing and underperformance. Positive signs in the columns headed with underpricing and underperformance mean increasing the level of underpricing/underperformance, and negative signs mean the opposite. (H) represents “hypothetical”, and relevant hypotheses can be made for future research. “Loss aversion, etc.” stands for the first part of Subchapter 2.3.2, i.e., the endowment effect, status quo bias and loss aversion. “Attachment Bias, etc.” stands for the first part of Subchapter 2.3.3, i.e., attachment bias and psychological ownership.*

Conclusion

In this dissertation, research on IPOs is reviewed from the perspectives of the issuer, underwriter and investor. IPOs are the focus of this dissertation not only because IPO-related topics always raise abundant discussions in both research and practice but also because, in my opinion, IPO shares can be perceived as an initiation into the stock market. Each stock in the secondary market has been through the IPO stage; hence, studying the origination of stocks would provide a new approach to perceiving the stock market in general.

In traditional finance, a great number of research has been conducted based on two major hypotheses, which are the *efficient market hypothesis* (EMH) (Fama, 1970) and the *rational man hypothesis* (Mill, 1994; A. Smith, 1789). The EMH assumes that stock prices should reflect all available information in the market and hence follow a random walk pattern, in which price ups and downs should be equally distributed. The rational man hypothesis, when applied in the stock market, describes that investors are always able to make optimal decisions based on available information (Bak, Paczuski, & Shubik, 1997). The EMH and rational man hypothesis draw a picture in which the fallible nature of human decision-making is completely eliminated.

Obviously, the abovementioned hypotheses are at odds with IPO phenomena observed in the market such as underpricing, flipping activity, underperformance, and cold and hot issues. In my opinion, these IPO phenomena can be attributed to two major reasons. First, from a financial perspective, the stock market is inefficient, and asymmetric information is one important cause of this inefficiency (F. Allen & Gorton,

1992; Mishkin, 1990). Second, from a psychological perspective, most investors are irrational and tend to be influenced by cognitive factors, affective factors and social factors when making decisions (K. Baker & Nofsinger, 2002; Hirshleifer, 2001). Hence, these two reasons form the theoretical background of this dissertation whereby the IPO phenomena are reviewed based on both financial and psychological work.

The pilot line of this dissertation primarily follows the sequential order of the IPO process, particularly from Chapter 3 to Chapter 5. Specifically, Chapter 1 provides basic concepts about public financing and IPO related concepts. The practical application is that it provides a standard procedure that issuers can follow when they consider financing and helps issuers to identify whether it is necessary for them to issue an IPO in the first place. Chapter 2 introduces the multiple agency theory and reveals the interest conflicts of the three parties. By differentiating the asymmetric information between investors and issuers and that between issuers and underwriters, two new approaches of defining underpricing are introduced as follows: 1) necessary underpricing, which cannot be controlled by any party and is mainly caused by market inefficiency, and 2) intentional underpricing, which is caused primarily by underwriters. The first two chapters primarily focus on introducing background information about IPO phenomena and the three parties from a financial perspective. In Chapter 3, IPOs are discussed from the issuer's perspective. By analyzing the influence of CEO founder status and CEO overconfidence on underpricing and underperformance, it suggests to boards of directors which type of CEO should be hired when IPO companies are in a specific stage. In Chapter 4, IPOs are discussed from the underwriter's perspective. By

following the sequential order of the IPO process and analyzing the parameters that influence underpricing and underperformance, this chapter offers issuers the potential factors that may lead to underpricing and underperformance in each stage of an IPO. In other words, the practical application is that it reduces the asymmetric information between issuers and underwriters and helps to decrease intentional underpricing by demonstrating the factors that issuers should pay attention to while collaborating with underwriters. In Chapter 5, IPOs are discussed from the investor's perspective, including investors before companies start to issue IPO shares (venture capitalists), investors who purchase IPOs in the primary market (institutional investors) and investors who purchase IPOs in the secondary market (individual investors). Specifically, by presenting factors related to individual investors in a sequential decision making order, this chapter demonstrates the cognitive and affective biases that individuals tend to exhibit. From the perspectives of issuers and institutional investors, it indicates that they should avoid individual investors in IPO allocations under most circumstances. From the perspective of individual investors, it helps them to understand the psychological factors that influence their trading patterns, indicating that they should either be careful with IPO investments or try to avoid falling into biased judgments.

One overarching contribution of this dissertation is that underpricing and underperformance are reviewed from a comprehensive level. In most of the extant literature, underpricing and underperformance were considered effects caused by one or two factors of one party. However, in this dissertation, it is clear that they should be

perceived as joint results from different factors of all three parties. Specifically, over 20 parameters are found or assumed to exert influences on underpricing based on research in both financial and psychological work (Figure 9). Extant financial work explains underpricing from the perspective of asymmetric information among different parties and the inefficiency of the stock market. Extant psychological work explains it from a cognitive perspective, affective perspective and social perspective. This dissertation redefines how underpricing is perceived in traditional finance by emphasizing the lack of control in the secondary market and the irrationality of individuals. It suggests that the traditional research on underpricing should not only be extended to the secondary market but also incorporate psychological analysis of individual investors, who are the primary participants in the secondary market.

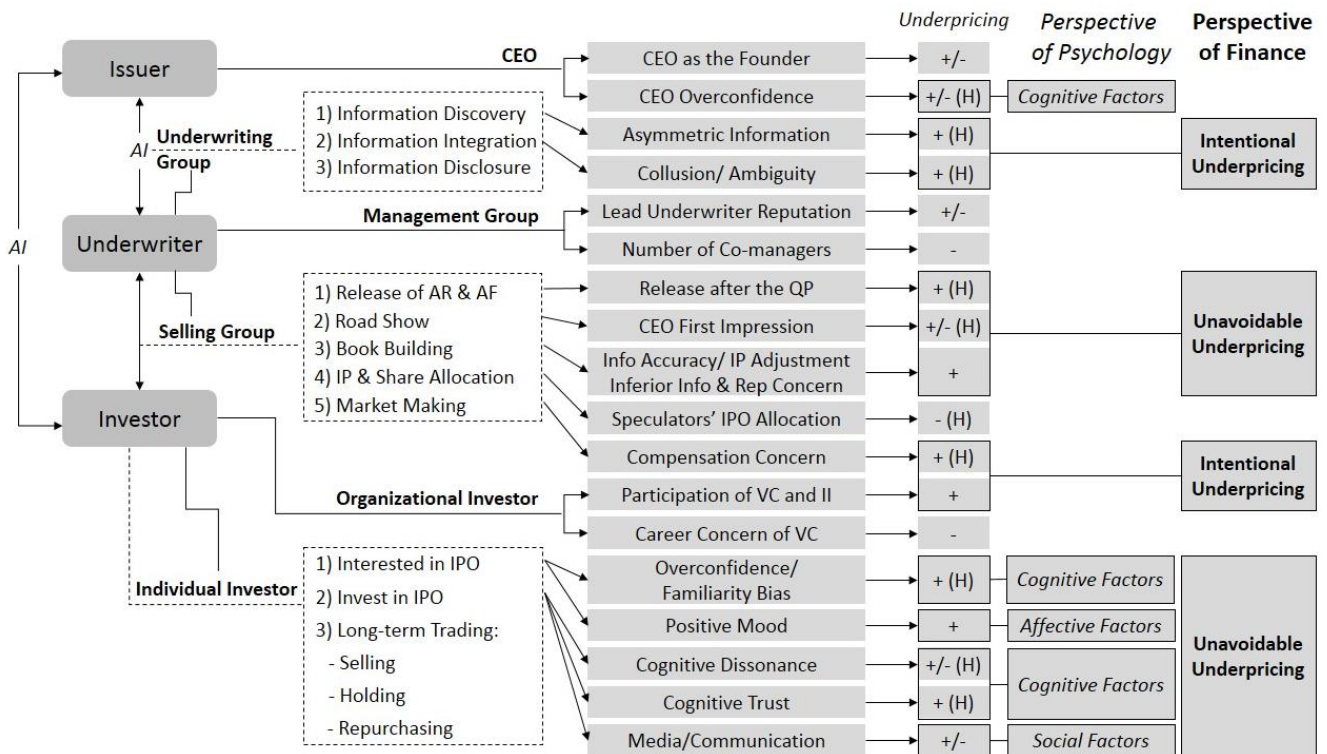


Figure 9 Underpricing phenomenon and its contributing factors. The grey bars in the middle are parameters that influence underpricing. Pluses in the column with underpricing mean increases in the level of underpricing, and minuses mean the opposite. (H) represents “hypothetical”, showing that relevant hypotheses can be made for future research. The abbreviations included are as follows: AI...asymmetric information; AR...analyst report; AF...analyst forecast; QP...quiet period; IP...initial price; Info...information; Rep...reputation; VC...venture capitalist; II...institutional investor.

Similarly, over 20 parameters are found or assumed to exert influences on underperformance as well, which are, again, based on research in both financial and psychological work (Figure 10). One significant difference between underpricing and underperformance is that the latter is a long-term phenomenon and exists only in the secondary market. As previously stated, individual investors are the key party in the secondary market; hence, the parameters that influence underperformance can be easily perceived from a psychological perspective with a cognitive aspect, affective aspect and social aspect but remain difficult to categorize into a couple of universal aspects from a financial perspective. This dissertation offers an innovative perspective by

perceiving underperformance from the perspective of investors, especially individual investors. In particular, massive selling behaviors in the secondary market create underperformance, and vice versa. Hence, it shows that fundamental analysis by the traditional finance paradigm may be ineffective in analyzing underperformance, especially when the secondary market is packed with irrational individual investors. Similar to underpricing, underperformance is not only influenced by the behaviors of issuers or underwriters but also is stronger affected by the trading behaviors of individual investors. This dissertation suggests that it is insufficient to relate stock market performance, particularly long-term underperformance purely on the intrinsic value of the firms. Additionally, for future analysis the psychological factors that trigger the trading patterns of individual investors shall be implemented when explaining underperformance.

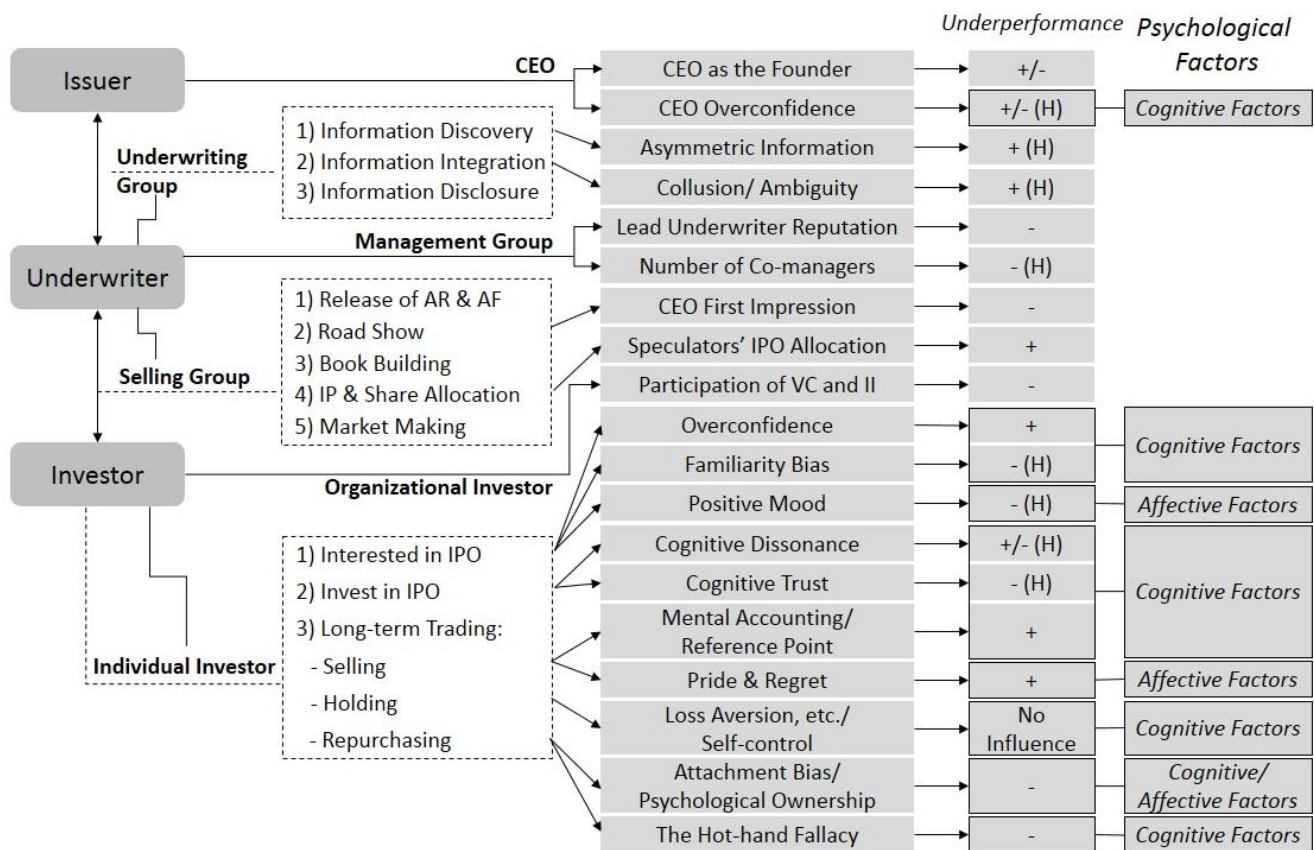


Figure 10 Underperformance phenomenon and its contributing factors. The grey bars in the middle are parameters that influence underperformance. Pluses in the column with underperformance mean increases in the level of underpricing and underperformance, and minuses mean the opposite. (H) represents “hypothetical”, showing that relevant hypotheses can be made for future research. The abbreviations included are as follows: AR...analyst report; AF...analyst forecast; IP...initial price; Info...information; VC...venture capitalist; II... institutional investor.

Another contribution of this dissertation is that several hypotheses are made for future research relating to the parameters and their influences on underpricing and underperformance. These hypotheses are supported by the extant literature together with suggestions on approaches to measuring some parameters. Specifically, the hypothetical relationships between the parameters and IPO phenomena can be found in Figure 9 and Figure 10 in the sectors marked with (H). Theoretically, it offers an overview about potential further research, and practically, it helps each party to understand how their behaviors may influence the IPO in both the short and long term.

One limitation of this dissertation is that due to the components of each party and the focus of extant literature being different, it is difficult to maintain an approach to disentangle the parameters in a consistent manner. In particular, the proportions of financial work and psychological work could be unevenly distributed among the 5 chapters. Another limitation is that although due diligence has been conducted throughout the writing process, it is still possible that not every parameter that influences underpricing and underperformance has been included.

The last practical contribution of this dissertation is that when disentangling the factors that may increase or decrease the two IPO phenomena, the order in which this dissertation is written makes it easy for decision makers to identify which factors they should control or influence at different stages of the IPO process. Additionally, special attention needs to be paid to parameters that (hypothetically) increase both underpricing and underperformance such as possible collusion between issuers and underwriters in the information integration stage or allocation to speculators in the stage of IPO shares allocation.

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